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THE ESTABLISHMENT OF AN EXPERIMENTAL PRE-EMPLOYMENT TEST BATTERY FOR THE CLERICAL FORCE OF COMPANY X

Submitted by

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(A.B., Eastern Nazarene College, 1937)

In partial fulfillment of requirements for
the degree of Master of Education

1945

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PREFACE

This service study is a report of the work completed to date towards the establishment of a pre-employment test battery to be used in selecting clerical workers for Company X. The study covers only asfar as the setting up of an experimental test battery for new workers. It has involved a certain amount of library research, the administration of psychological tests selected after studying the work and the workers concerned, the analysis of statistical data, and the establishment of a trial test battery.

This study is not a thesis. Nothing has been proven. Due to circumstances beyond the author's control, there are some weaknesses in scientific techniques. The main drawbacks are the small number of cases available and the questionable value of the criterion. It is, however, a complete report of the work involved in a practical industrial selection problem under the conditions not of the school room but of the factory.

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CHAPTER I

INTRODUCTION

The field of industrial psychology, a natural outgrowth of educational psychology, has grown rapidly in the last quarter century. Many business organizations, the larger ones particularly, have firmly established policies which involve making the utmost of applying good psychological principles to the selection, training, upgrading, and retaining of their employees. The smaller companies, too, are cognizant of the value, both in dollars and cents as well as intangibles, which may be derived from scientific personnel procedures. These companies are limited financially, however, and cannot afford the specialized personnel or the time to develop and maintain a psychological service of their own. To assist the small companies, organizations similar to the Industrial Counseling Service of Boston University College of Business Administration have been established in some universities throughout the country. This study is an account of how one personnel selection problem was handled.

Statement of the problem.-- The problem, in essence, is stated in the title of this service paper. The

president of Company X, looking ahead to post-war conditions, commissioned the Industrial Counseling Service to establish through experimentation, a pre-employment test battery for clerical employees. The doing of this involved studying the work and the worker, selecting, administering and analyzing psychometric tests, treating the data statistically, and setting up selective procedures to be used by the employment supervisor.

Setting of the study.-- Company X was founded 54 years ago by a young man who was unable to procure buttons that could be fed to his button-sewing machine. With true Yankee resourcefulness, he began manufacturing his own buttons, making them uniform in quality and size. Today it is the button manufacturing rather than the machine-sewing that is the mainstay of the business. Originally a one-room factory with a handful of workers, the company now occupies a group of modern brick buildings and employs approximately 350 people.

Its regular products include newspaper matrixes and many different types of buttons. As a war measure, the Company has been producing gas-resistant bags and other materials for Chemical Warfare, eye shields, and special buttons for military use. Recently the employees received the Army-Navy "E" award in recognition of their

phenomenal success in meeting "blitz" government orders.

At present the Company is still producing at an abnormal rate and expects that post-war production will naturally slacken. Peace-time plans, however, are not based on curtailment, but rather on sound plans for normal growth. It is the averred desire of the management to fortify the Company's place so that it will always be one of the city's leading industries.

With the acumen of the successful business man, the Company's president realistically faces the fact that a profitable factory requires, in addition to orders for goods, personnel to make the goods. Emphasis is placed on making Company X a good company for which to work. The quality of personnel is, therefore, important, and to improve and maintain a happy and productive working force is his aim. To this end scientific employment procedures are being introduced.

Definition of terms.-- All the technical terms, statistical and psychometric, have been used in accordance with their most commonly accepted definitions. There are, however, five terms which deserve specific definition.

1. "Clerical workers" refers to those persons who are supervised by the office manager and whose work consists of one, two, or three of the following clerical

functions delineated by W. H. Leffingwell:

> The first of these functions is planning -- determining what is to be done and when and where it is to be done. The second is communication -- corresponding and interviewing both within the office itself and between the office and outsiders. The third, accounting and record-keeping, includes computing, recording and filing of all sorts. (14:144)

2. "Test battery" refers to a group of tests statistically selected whose combined score gives a better measure of potentiality than any one test used by itself.

3. "The office group" always refers to those 22 women clerical workers who constitute the basic experimental group.

4. "Selection" is used in accordance with Yoder's definition:

> Strictly speaking, selection refers to the negative practice of eliminating from among all the candidates considered for possible employment those who appear unpromising. (74:159)

5. "Placement" is also used according to Yoder's definition:

> Placement, as the term is used in connection with selection, refers to the determination of the individual position to which an accepted candidate is to be assigned. (74:159)

Organization of the report.-- The research and results are described in the following pages according to this plan: In Chapter II an effort is made to orient the reader to the fields of industrial testing

in general and clerical testing in particular by reviewing a few studies which have been made and by citing opinions of testing which seem to be representative of those engaged in personnel work. In Chapter III the methods of procedure, the basic experimental group, the criterion, and the choice and administration of the tests are discussed. The statistical treatment of data with graphic charts and tables is largely confined to Chapter IV. A general summary and recommendations comprise the last chapter. The appendices contain a copy of each test used and other pertinent data. There are 78 references in the bibliography which, though not complete, does contain some of the most valuable publications on employment procedures.

CHAPTER II

REPRESENTATIVE OPINIONS AND STUDIES RELATED TO THIS STUDY

The Present Status of Industrial Testing

The comparative newness of the field.-- In spite of the evident advancement in psychological tests, many industrialists are still skeptical about their use. Perhaps the word "still" is ill-advised, because when tests first became popular shortly after World War I, they were greeted by many as a panacea for all personnel troubles. During the depression they were popular because of the abundant labor market and the resulting necessity for eliminating many applicants. Labor shortage, however, tends to push tests back on the shelf again and, if it were not for the war emergency calling into factories untrained and inexperienced people, psychological testing might still be the concern solely of the psychologist. As recently as 1940, Taylor wrote:

> Although tests in industry have been talked about and written about, used and abused, praised and damned, for over 20 years, one still hears, time after time, the question "Do you believe in tests?" -- as if psychological tests represented some new kind of religion. (41:12)

The industrial emphasis.-- In reading the literature, especially fairly recent contributions, one is impressed with the emphasis on cautions, what not to expect, what not to do. Reiterated again and again is the idea that tests do not replace, but merely supplement accepted employment procedures. Perhaps the lag in developing industrial tests is partly due, not to indifference, but to early misguided over-enthusiasm.

Industrial testing is largely restricted to selection and placement, selective functions being utilized the most frequently. Tests which have proved to be most practical have been those of intelligence, clerical ability, and mechanical aptitude. The important relationship between temperament and job success is recognized, but due to the difficulties involved in measuring temperament, not very much has been done. Wadsworth has done some interesting and worthwhile work in this area (70) (71). The Bernreuter Scale has proven satisfactory in some companies.

Another emphasis peculiar to industrial psychology is the difference between the educational and the industrial points of view. The following quotations are representative:

> Personnel men who use tests as selection tools are not concerned with the same problem as academic men. Their concern is not with levels of intelligence, degree of mechanical ability, amount of clerical ability, or extent of personality development. Their concern is with the particular kind of ability that the demands of their organization establish, with the particular kinds of mechanical skill that must be acquired by operators of their machines, and with the particular personality assets that their organization demands. For that reason, the tests that are selected are in terms of organizational needs first and foremost. (41:5)

> .....the applications of psychology in such a factory, in perhaps all factories, are limited by three controlling factors, -- (a) cost, (b) time, and (c)(to use a phrase coined by some astute diplomat), "the pressing needs of production". ....It means abandoning the academic attitude and so remodeling the situation that it meets requirements as they are and not as we would like them to be. (43:161)

A third emphasis of the industrial psychologist is on the acceptance of any improvement in employment procedures, no matter how slight.

> Although correlations obtained in industrial testing are relatively low, indicating a wide margin of error, any increase of probability over chance is of major importance. (16:133)

> The test is no crystal ball, no magical device, no modern equivalent for the Biblical prophets. Again, it is simply a method of increasing, in a modest but useful way, one's "batting average" in picking the right man for the job. (40:15)

> But what, in practice, is far more important than a high correlation coefficient is that the test should broadly distinguish the good workers from the bad. (44:129)

For a comprehensive view of employment psychology, the texts by Bingham and Freyd (12), Moore (42), Viteles (66), and Tiffin (63), are especially recommended.

Clerical Testing

Present status of clerical testing.-- In spite of the fact that of all industrial testing, testing for clerical work has been the most widely and successfully used, Hardaway writes in March, 1945:

> No single test or battery of tests has yet been devised that will predict a student's success in learning the skill subjects of the commercial curriculum or in holding an office position involving those skills after they are learned. (32:371)

Amazing too, in view of the abundant literature on the subject, is that not until Potter's thesis (51), published early in 1944, had a scientific analysis of the actual work of general clerical employees been made. According to Potter's investigation, the average general clerical worker spends most of her time typing, filing and operating a simple calculating machine.

There are even those who are not convinced that there is an entity called "clerical aptitude" which may be measured, but Andrew's and Paterson's investigations (5) seem to point in that direction. Bills and Pond)10), in independent studies, demonstrated that there is a significant and consistent relationship between

intelligence test scores and advancement in clerical work. Despite some minor disagreements on clerical testing, however, the consensus of experts is that a well-selected battery of clerical aptitude and intelligence tests will result in much improved selection and placement procedures.

Review of five representative studies.-- There are in the literature many accounts of the use and value of tests in selecting clerical workers. Many reports are in general terms, however, and often not very much is given regarding the controls exercised over the experiments. The following five studies were selected for review because they seem to be fully reported, and they follow clear-cut scientific methods.

1. Stead and his associates report in Occupational Counseling Techniques (58:140-144) a battery of tests for operators of card-punch machines which was established by administering to 113 day and 124 night operators a group of trial items. Objective records of job performance were used for the criterion. By using the Wherry-Doolittle method, a combination of best items was selected which includes the number-comparison section of the Minnesota Vocational Test for Clerical Workers, letter-digit substitution items, tapping and dotting items of the MacQuarrie Test of Mechanical Ability Test, and selected personal data items. The validity coefficient

for the combined day and night shifts was .45. Using this material and other data on specific clerical jobs a general battery for clerical workers was found which distinguishes the upper, middle and lower thirds of the criterion.

Mention is made here of only one of many experiments carried on by the Occupational Research Program and reported in Occupational Counseling Techniques. The work is notable for its excellent control techniques and its objective criteria.

2. Bills made a study of 903 employees of the Aetna Life Insurance Company to discover what relationship there might be between a person's score on Bureau Test VI and job held. Jobs were classified on eight levels -- A being low and H, high. She found "that for at least this clerical group there is decided and consistent relationship between test score at time of employment and grade of job which it is possible for the employee to attain and hold successfully. This relationship persists or becomes more noticeable as the extraneous factors of sex, education and length of service are eliminated." (10:48) Pond, at about the same time but independently, reported similar findings. (10:55)

3. Wadsworth compared intelligence test scores of employees with their "man-to-man" rating on a three-point scale (outstanding, satisfactory, problem) made by

supervisors and found:

> Intelligence tests can be applied to a "service" organization in such a way as to multiply chances of successful selection. Scores in these tests do not tab and ear mark applicants who will invariably succed, but selections made within "favorable score ranges" increase the percentage of success.
>
> Intelligence tests findings will rule out some applicants who conceivably might succeed. The same statement could be made regarding any method of selection now in use. Not by any means infallible, test findings merely point to greater or less probability of success in given cases. (69:187)

4. Davidson reports the work of a committee appointed by the Life Office Management Association "to study and suggest to the organization a series of general ability and aptitude tests." Six tests were used in all. They were the Bureau Test VI, Thurstone Clerical Test, a Modification of Thurstone, the Minnesota Clerical Test, The O'Rourke Clerical Aptitude Test, Junior Grade; and the O'Rourke General Classification Test, Senior Grade. Two criteria were used. Individual tests were compared with supervisor's ratings, and later the mental alertness tests and the Minnesota Clerical were compared to the criterion of promtability. It was fo nd that the mental alertness tests "differentiated degrees of that quality of an individual that makes him promotable and that the clerical tests did not." As a result, only the mental alertness tests were retained. (18:64)

5. Hay and Blakemore (30) used the Otis SA, Form B (20 minutes) and the Minnesota Vocational Test for selecting clerical workers. They found that they obtained normal distributions of scores and that they were able to establish a critical score of 36 on the Otis and 130 on both sections of the Minnesota.

Mention should be made of the National Clerical Ability Testing Program which has been under the direction of F. G. Nichols of Harvard. It is essentially a method of evaluating achievement in the school's clerical curriculum. It is for the clerical student what the College Board Examination is to the preparatory student. The ability of persons certified by this program is unquestioned and employers welcome such applicants. However, as yet, this program does not have a very broad coverage.

Rating Scales

The wide variety of opinions on rating scales.--Jess T. Hopkins spoke wisely when he said:

> There are few subjects about which there is such a wide variety of opinion, and which so quickly lead to argument and debate, as merit rating. Therefore anyone who attempts to defend a certain type of form, particular weighted formula or numerical scoring method, list of factors or characteristics, to the exclusion of others, or even attempts to define those factors, can create for himself a nice little private war. (21:30)

Wadsworth (68) demonstrates the practicability of a three-point general rating; Stevens and Wonderlic (60) show how effective a rating on seven general traits can be. There are almost as many ideas on rating as there are psychologists. They all have the same aims -- objectivity, validity, and reliability; and they all have the same stumbling block, i.e., that the effectiveness of a rating scale depends largely upon the rater.

The value of rating scales.-- Raphael sums up the value of rating scales succintly when she says:

> Personally, I feel strongly that the main value of a rating scale does not lie in the descriptions given of the individual qualities of an individual, and still less in any attempt to make an arithmetical sum of them. Its value lies in forcing the rater to consider these various qualities so that he does not overlook any of them, and then he is in a position to make a final rating, summing them up perhaps under two headings -- "General value to the service in his present position": "Probable value to the service in the position to which he would be promoted". (51:210)

In spite of their imperfections, rating scales must fill an important place in industrial psychology. It is imperative, then, to use them wisely.

The National Industrial Conference Board publication, Plans for Rating Employees (48) gives samples of a variety of rating scales.

Summary

Industrial testing is far from being a common practice although it has been firmly established in some companies and proven very successful. The scholar in approaching the problem of industrial selection and placement must remember that second-best is better than nothing at all. Not that industry scorns scientific methods -- on the contrary, they are demanded -- but while working toward perfection, any methods, however imperfect, which reduce costs will be used in the interim. Clerical tests have been used most successfully in predicting success when they were co mbined with intelligence tests.

The question of rating scales is a moot one. Their subjectivity must always be taken into consideration when interpreting statistical correlations.

CHAPTER III

METHODS OF PROCEDURE

After careful consideration of the office situation, and with the work of other industrial psychologists in mind, it was decided to proceed according to the following plan:

1. Observe the nature of the clerical jobs for which pre-testing was desired.

2. Select an experimental battery of standardized tests and administer them to the present employees.

3. Establish a criterion for successful clerical workers.

4. Through correlation methods, determine the most significant tests, and, if possible, formulate a significant pre-test battery with established critical scores.

5. Follow up the testing program over a period of a year to discover weaknesses and correct them if possible.

The Group Tested

The office personnel (all women) who make up the experimental group were checked on four factors in particular -- job requirements, length of service, age,

and education.

Job requirements.-- There are three types of clerical work represented: 1. Cost and accounting work, 2. general clerical, and 3. stenographic and secretarial. A trained switchboard operator whose duties include sorting of mail and typing has been classified as general clerical. The workers are distributed as follows:

Cost and Accounting work	11
General clerical	8
Stenographic and secretarial ..	3

According to the company's job analysis cards[1/] made out by the personnel supervisor, all of these workers need to be able to talk, read, write, copy figures, add, subtract, multiply, and use decimals. One needed to dictate and three must have the ability to take dictation. Fourteen should be able to spell. All must be accurate. The degree and importance of these skills depends upon each job. A knowledge of typing is required of all general clericals, and skill in typing is demanded of stenographers.

Office machinery included, besides typewriters, a billing machine, a pay-roll machine, two comptometers,

1/ See Appendix B

and a Munro calculator. The policy of the company is to train workers on the job rather than employ regular machine operators. There is no need for experts since the machines are used merely to help in the figuring, and the office is geared to a manual rather than a machine production rate. The operator of the payroll machine is a former typist who has been given a week's training by the Burroughs Company. The billing machine is very similar to a typewriter and consequently a typist has no more trouble operating it than she would changing from a Woodstock portable to a Noiseless Underwood typewriter.

It is the opinion of the office manager that all the jobs, to be done well, need a worker who "can use her head and work quickly."

It appears, then, that the attributes and skills common to the entire office force are as follows:

1. Ability to learn (Intelligence)
2. Speed
3. Accuracy
4. Ability to work with figures

Of course, there are also personality factors which are important to success, but a study of these is irrelevant here.

Education.-- A survey of the amount of education of these women revealed the following:

1 completed 13 grades
18 completed 12 grades
2 completed 10 grades
1 completed 9 grades

Two of the people with less than twelfth-grade education are general clericals who have been employed by the Company for a number of years. The third is a cost clerk. The only person who has more than ordinary high school training is a recently hired clerk-stenographer. All employees were educated in American schools.

Age.-- The ages of the group range from 19 to 67. The median age is 27.5; the mean age 33.2. Two people, one 67 and one 55, are quite far out of line and therefore the median age is more revealing than the mean.

Length of service.-- Four of these women have completed long terms of service for Company X (13, 15, 22 and 25 years, respectively). Eight have been working here from one to four years, while ten have been employed for less than a year. Four of these ten have less than three months service, but all four had at least one year of clerical experience before joining the Company. The entire group, then, may be considered as experienced

clerical workers.

Tests Administered

An examination of the jobs and duties of the clerical force shows that in only a few cases is specialized pre-employment training needed, as most of the training is on the job. The three stenographers need skill in shorthand and typing; the general clericals should know how to type; members of the accounting department should have a knowledge of bookkeeping. All jobs seem to require in common certain skills and attributes. It is the purpose of the general test battery to measure potentiality for, or possession of, these common attributes. Candidates for those jobs requiring technical skill will be given an achievement test in addition to the aptitude battery.

The tests[1/] which constitute the experimental group were selected according to the following criteria:

1. They must be based on aptitude, not achievement.
2. They must be scientifically constructed.
3. They must be brief
4. They must be easy to administer.

The Minnesota Vocational Test for Clerical Workers.--[2/]

1/ Copies of all tests used may be found in Appendix A.

2/ For a detailed description of its construction, refer to bibliographical item #5. Other accounts of experimentation with this test may be found in items #2, 3, 4, 17, 27, 30, 31, 58.

The general nature of this test is given in the manual as follows:

> The test consists of two parts, a number checking and a name checking test. In each of the tests, there are two hundred items, one hundred of which are the same and one hundred of which are different. The numbers range from three through twelve-place numbers, and the names from seven through sixteen letters. The test is so arranged that the first one hundred items may be compared with the second one hundred items of each test. (75:1)

The Minnesota Clerical is probably the best known and most widely used of all clerical tests. It has been scientifically constructed and has been experimented with extensively. The reliability coefficient for both number and name checking is .9, while the validity coefficients hover around .6. The scoring is simple and testing time short (15 minutes). According to its authors, it measures "...an aptitude which is related positively to the abilities to observe and compare, to discriminate small differences rapidly, to adjust to a new situation and to give attention to a problem." (4:69)

<u>Test of Clerical Competence</u>[1/] by A. J. Cardall and <u>J. Gilbert</u>.-- The purpose of this test as stated in the manual of directions is:

> This test is designed to measure aptitude for a variety of clerical occupations and other occupations in which perceptual ability and the

1/ Published by Science Research Associates, Chicago, 1944

> ability to deal with small details is important. It consists of the following four parts: 1. Checking (numbers) - N; 2. Checking (names) - V; 3. Classification - V; 4. Classification - N. (76:1)

The first two sections, number and name checking, are somewhat similar to the Minnesota test. However, the comparisons are made between handwritten and typed items. The problems in the name section differ also in that they contain two parts, a name and an address.

The section titled "Classification - V" consists of statements from typical business letters. The task of the testee is to indicate the department that would handle such correspondence. There are six possibilities, (Order Department, Bookkeeping Department, etc.) and each one is defined in the key at the beginning of the section.

"Classification - N", the last sub-test, is a simple accounting problem. Amounts for invoices, which are listed in haphazard order, are to be classified according to date, and monthly totals and certain bonuses are to be computed.

It is a new test, and therefore there is nothing in the literature about it. The reliability coefficient computed by the Kuder and Richardson t formula is .99. Validity coefficients range from .17 to .90, the higher coefficients appearing in the departments handling the

most genuinely clerical work. Testing time is 23 minutes and scoring is quick.

Its apparent statistically sound method of construction, and the fact that it was built from the beginning in an industrial rather than an educational situation were the chief reasons for its inclusion in the experiment.

Survey of Working Speed and Accuracy[1/] by Floyd Ruch.-- The purpose of this test is to select persons to do routine operations requiring speed and accuracy. It, too, was constructed primarily for industrial rather than educational use. It consists of four sub-tests -- Number Checking, Code Translation, Finger Dexterity, and Counting. They are described in the manual (77) as follows:

> NUMBER CHECKING. The number checking test differs from other tests of this type in that code letters, plus-, minus-, per cent-, and dollar signs were included to make the test more closely resemble office and shop clerical procedures.
>
> CODE TRANSLATION. This test measures the the ability of the applicant to learn and apply complicated procedures in the minimum of time. The mentally alert applicant will soon memorize the code and thus translate without referring to the key.
>
> FINGER DEXTERITY. This test was designed to measure finger dexterity as it is involved in filing and in the operation of a wide variety

1/ Published by California Test Bureau, Los Angeles, 1943

of office machines. It is also meant to measure the ability and willingness of the applicant to work at a highly monotonous task.

COUNTING. In this test the subject counts each vowel in each line of meaningful prose. It is intended to measure the type of ability involved in proof reading and in checking reports and statistical tables. In taking this test the subject must ignore the story idea and respond to the details in isolation.

Testing time is 20 minutes. Scoring is just a little complicated. Information relative to reliability and validity is scanty. In spite of this, the test was included for experimentation because of its industrial emphasis.

The Adaptability Test[1/] by Tiffin and Lawshe.-- The value of an intelligence test in selecting clerical workers has been demonstrated repeatedly (8) (10) (18) (30) (71), and therefore one's selection was considered very important. The Adaptability Test[2/] meets the criteria of being brief, (15-minute time limit), easy to administer, scientifically constructed, and a measure aptitude. Its purpose is stated in the manual as follows:

The Adaptability Test is designed to measure mental ability or mental alertness. It can be used as an employment aid, not only in selecting and identifying persons who should be placed on

1/ Published by Science Research Associates, Chicago, 1942

2/ For a description of its construction see bibliographical item #64.

> jobs that require rapid learning, but also those who do not readily adapt to new situations but who might be satisfactory (or even superior) employees on simple, routine jobs such as packing, inspecting, or assembling, or in operating simple, repetitive machines. (78:1)

It is an omnibus test consisting of 35 items and included problems which involve arithmetical reasoning, verbal analogy, reading comprehension, and number series. Reliability coefficients range from .79 to .93. The validity is "expressed in terms of the biserial coefficients of correlation between test scores and rated success on the job." (78:5) The biserial r for Form A is .40; Form B, .56. Form B was used in this experiment.

The inclusion of the Adaptability Test rather than some other well-known mental alertness test was due to the way it is "set up". Time and again incidents occur which reveal the prevalence of a fear of "I.Q." tests. The title and instructions of the Adaptability Test have been designed to dissipate that fear. These introductory directions which appear on the front cover, are as follows:

> Some jobs require figuring -- such as adding, subtracting, multiplying, and dividing -- while others require writing reports or answering letters, and still other jobs can be done well by people who are not particularly apt with figures or words. This test will help in determining how well you can handle jobs that require these abilities.

> Do as well as you can on this test, but do not worry about it. Remember that you may be well qualified for certain jobs that require training or skills different from those covered in this test.

Administration of the tests.-- The tests were given in the recreation room of the factory to 12 of the group on a Tuesday morning. The remainder took the tests the following Tuesday. It took approximately two hours to administer all the tests to each group.

The employees were told beforehand that these tests had nothing to do with their jobs. It was explained that their co-operation was sought to help the management organize a pre-employment testing service for future employees.

The Criterion

The need for an objective criterion cannot be overestimated, but at present it is impossible to obtain one for these clerical workers. A supervisor's rating, subject as it is to much error, was the only available criterion.

Difficulties of obtaining a criterion.-- Before testing was begun the personnel manager was asked if there were three or four people who knew the workers well enough to give them a fair rating. He recommended that the office manager, the president of the firm, the assistant personnel manager and he himself supply the

ratings. In subsequent visits to the plant, however, the author became firmly convinced that all but the office manager were too far removed from the worker to judge fairly. The office manager, on the other hand, not only directs the work of the people involved in the experiment, but he also must O.K. it.

The criterion used.-- In view of the circumstances it was decided to use only the office manager's rating for the criterion. Nevertheless the other three ratings were obtained. First, it was hoped that the knowledge that others were also rating the workers would help the office manager to be as objective as possible. Second, although only his ratings were used for purposes of the study, correlations between average test performance and all ratings were computed and are recorded in Chapter IV just as a matter of interest. The ratings of all judges were made without knowledge of test results.

Rating procedure.-- Directions for rating were given orally to be sure that there was mutual understanding as to just what was wanted. It was explained that all workers were to be judged on ability and job performance. The factors of accuracy, speed, ability to learn, dependability and initiative were to be considered. Such factors as "personality", co-operativeness

and appearance were to be disregarded. An overall rating on a five-point scale was to be given. A rating of "five" indicated a person whose quality and quantity of work was superior; a rating of "one" indicated a person of little value to the Company. It was explained that a "three" rating would be given to the largest group because this rating represented the generally satisfactory worker.

Re-rating.-- Four months later the office manager was asked to re-rate the same employees. This time he was given written instructions and a work sheet.[1/] He had no knowledge of test scores. The correlation between his first and second rating was .85. A comparison of the ratings showed that he was more severe in his judgments the second time.

Summary

In order to establish pre-employment testing procedures for future clerical employees of Company X, it was decided to administer an experimental group of standardized tests to all presently employed clerical workers to discover, if possible, a significant test battery. Three tests of clerical aptitude -- The Minnesota Vocational Test for Clerical Workers, Test of Clerical Competence by Cardall and Gilbert, and the

1/ See Appendix B.

Survey of Working Speed and Accuracy by Ruch -- and a mental alertness test, (Adaptability Test by Tiffin and Lawshe) were administered.

Each employee was rated by four judges on a five-point scale, five being high. The qualities taken into consideration in deciding upon a rating were speed, accuracy, ability to learn, dependability and initiative. The subjectivity and unreliability of such a rating was recognized, but because of the nature of the clerical work, no more objective standard was available. The only judge deemed qualified by the author to rate fairly was the office manager, and therefore it was decided to use only his rating for the criterion.

CHAPTER IV

STATISTICAL TREATMENT OF THE DATA

Basic Statistical Computations

Means, sigmas, and correlations with rating.--

The means, standard deviations, and correlations with the criterion were computed for all tests, sub-tests, and for the percentage of error on both sections of the Minnesota, each score constituting a variable. They are listed in Table 1.

Table 1. The Means, Standard Deviations, and Correlations with Ratings of all Tests, Sub-Tests, and the Percentage of Error on Both Sections of the Minnesota Clerical

Test	M	SD	r
Adaptability	14.22	4.10	.53
Clerical Competence (Tot.)	200.80	29.49	.53
Number Checking.....	89.03	21.07	-.04
Name Checking.....	60.70	14.28	.30
Classification (V.)..	25.62	6.15	.47
Classification (N.)..	10.50	7.02	.61
Minnesota Clerical			
Names (Speed).....	131.70	24.26	.61
% of Error.....	5.63	3.11	.54
Numbers (Speed).....	123.60	21.50	.36
% of Error.....	3.99	1.96	.43
Survey of Working Speed.			
Number Checking.....	126.80	17.75	.51
Code Translation.....	97.70	25.26	.26
Finger Dexterity.....	746.00	143.50	.42
Counting.....	37.00	9.95	.39

Probable errors of the mean were also computed, but have little statistical significance because of the small number of cases (22), and they were, therefore, omitted. Also in view of the fact that there were only 22 cases involved, the rank-order method of correlation was used. The p's were converted to r's by using Garrett's table (26:362).

There are five variables which have correlations of .53 or better:

Minnesota, Names Section (Speed).	.61
Minnesota Names Percentage of Error	.54
Adaptability Test.....	.53
Classification-N.....	.61
Clerical Competence (Total).....	.53

The total score of the Test of Clerical Competence involves a duplication of items, and since the relationship between the Classification-N section and the criterion is higher than that of the total score, the total score was discarded, leaving four statistically significant tests.

Intercorrelations of significant tests.-- The four significant tests were correlated with each other to determine the amount of overlapping. These correlations are shown in Table 2.

Table 2. Intercorrelations of Four Significant Tests

Variables	(1)	(2)	(3)	(4)	(5)
Rating (1).....		.61	.54	.61	.53
Minnesota Names (2)....	.61		.21	.42	.48
% of Error (3).....	.54	.21		.27	.55
Classification-N (4)...	.61	.42	.27		
Adaptability (5).....	.53	.48	.55	.29	

The intercorrelations, with one exception, were lower than the correlations between the tests and the criterion, indicating that they measure somewhat different factors.

Multiple correlation and regression equation.--To ascertain the predictive value of the battery of four tests, the Doolittle formula (30:364-5) for multiple correlation was employed. A R of .81 - .053 was obtained. This means that the predictive efficiency of the battery is much higher than any one of the tests used by itself.

By means of a regression equation, the formula for weighting each test was derived. The formula is:

$$X_1 = .15X_2 + .109X_3 + .051X_4 + .130X_5 - 1.277$$

The variables are as follows:

X_1= Index
X_2= Minnesota Names (Speed)
X_3= Converted score on Minn. Names % of Error 1/

1/ In order to make scores comparable with other variables, descending numerical values were given to each step in the norm table. Thus, a person with no errors received a score of 14; 12% of error converted to a score of 1. This is what is meant by a "converted score".

X_4= Classification-N
X_5= Adaptability Test

By using this formula, an index, which is the performance rating predicted by the test battery, may be computed.

Group Differences

Comparison of high, middle, and low groups.-- In order to determine how much the tests discriminate between the good and poor workers, those rated five, three, and one and two by the office manager were compared with each other. Ordinarily if group four were eliminated, group two would be also, but because of the few cases, groups one and two had to be combined. The raw score average for each group on each test was computed.

Explanation of the graphs.-- Figure 1 reveals that the average raw score on the Adaptability Test of those rated five was 18.5, which is at the 87th percentile. The poorest workers (those rated one and two) had an average raw score of 10.5 which places them at the 20th percentile. The average score of the workers rated three was 14.1, 50th percentile.

In the case of the percentage of error on the Minnesota Names Section, the figures had to be changed to percentage of accuracy in order to maintain comparable values; and so it is this "percentage of accuracy" which is shown for the three groups in Figure 2. Figures 3

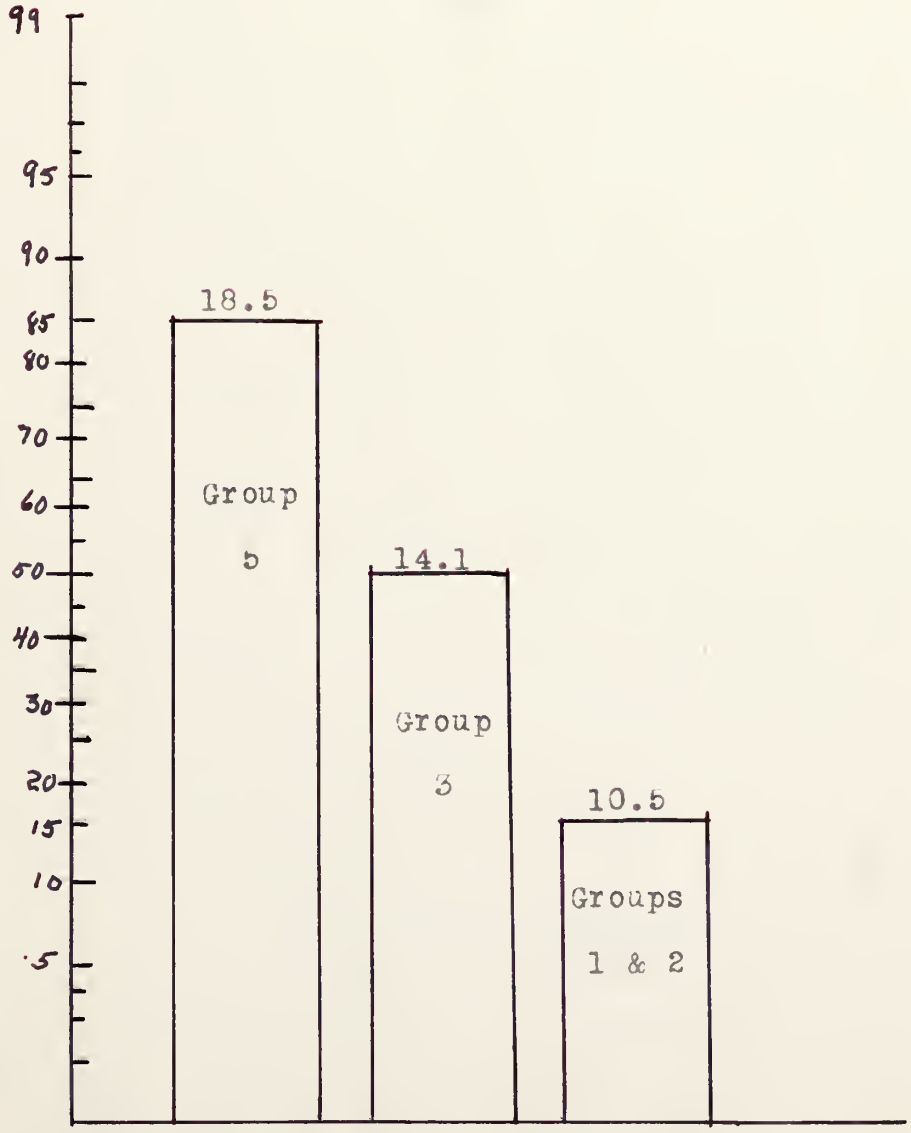

Fig. 1 -- Average scores on the Adaptability Test of workers rated 5, 3, and 1 & 2.

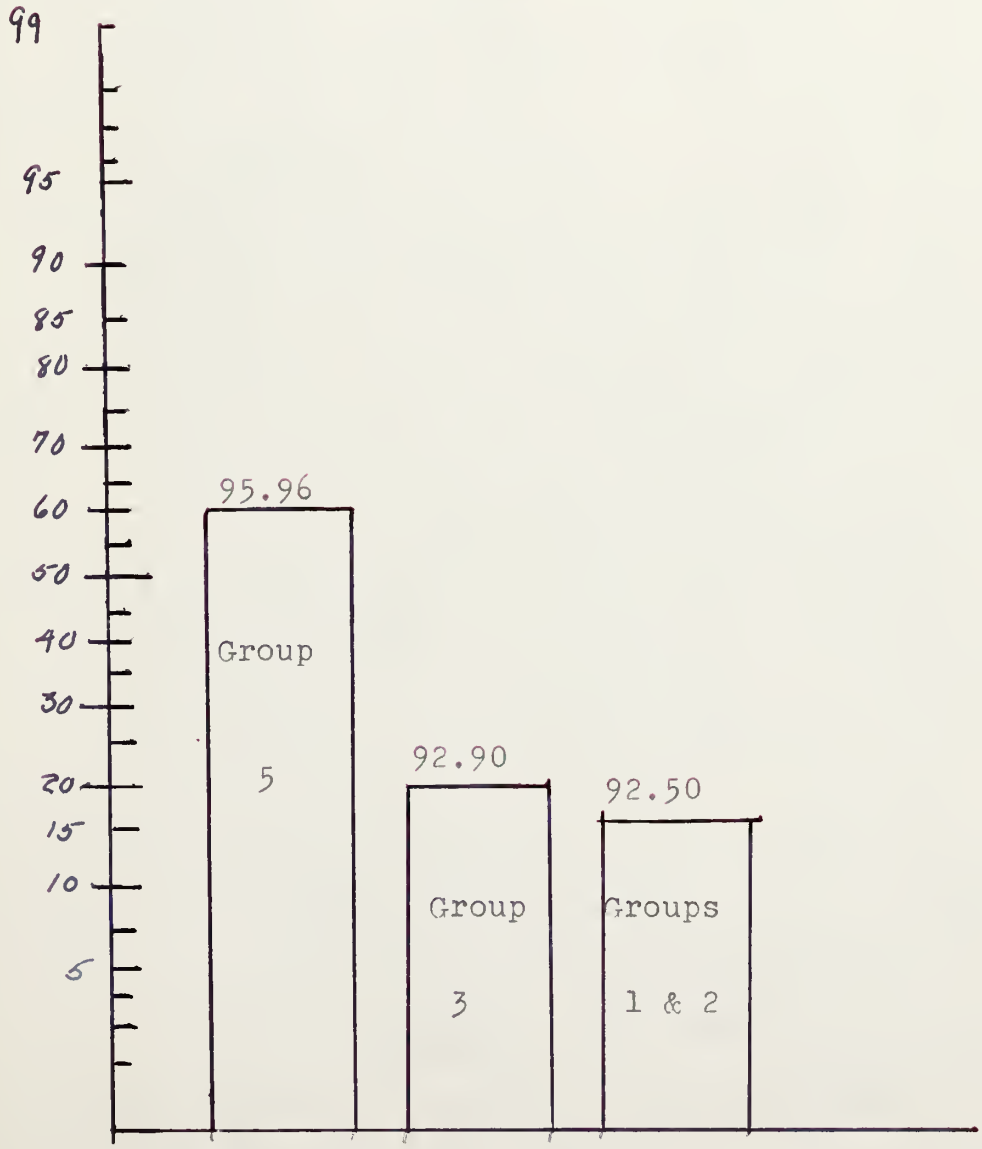

Fig. 2 -- Average percentages of accuracy on the Minnesota Clerical Test of workers rated 5, 3, and 1 & 2.

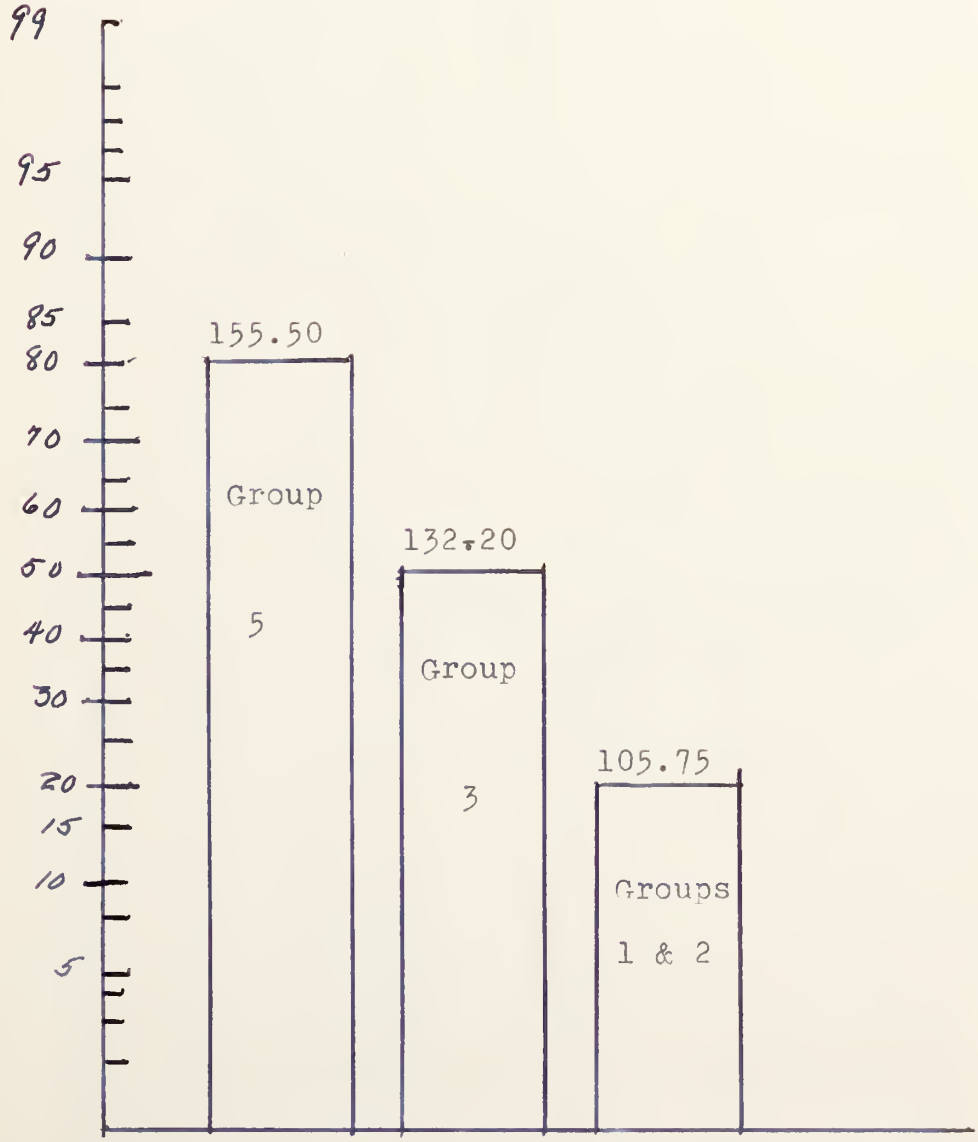

Fig. 3 -- Average scores on the Minnesota Clerical Test (Speed) of workers rated 5, 3, and 1 & 2.

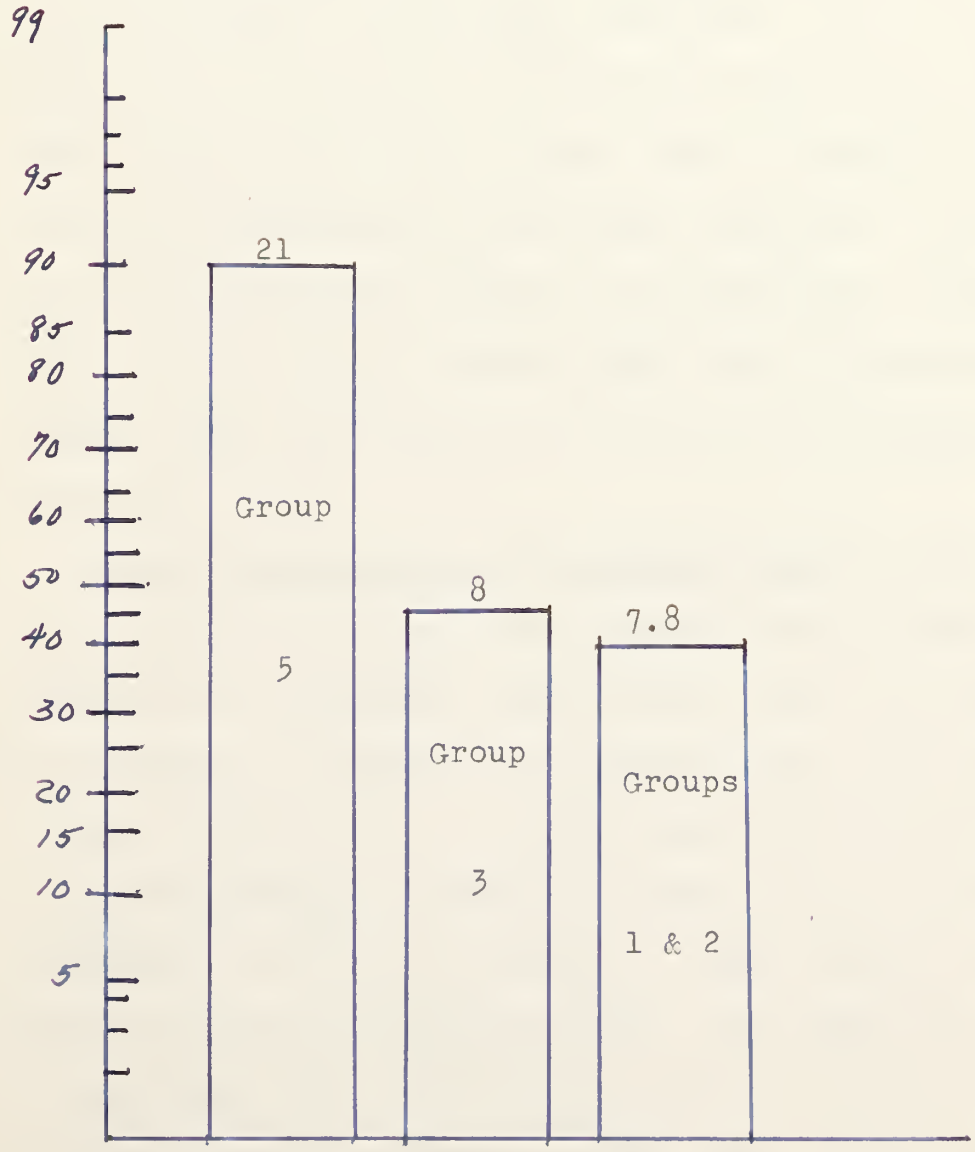

Fig. 4 -- Average scores on the Classification-N section of the Test of Clerical Competence of workers rated 5, 3, and 1 & 2.

and 4 present the average raw scores on the other two tests of the battery.

Computation and Use of a Weighted Score

The need for a weighted score.-- The computation of the index described in a preceding paragraph is, for the layman, a complicated procedure. Since this battery is to be used by a person not trained in statistics, the necessity for a simple method of arriving at a predicted performance rate became apparent. A method for computing weighted scores was devised and a norm table set up so that a person might find the equivalent weighted score of a given test by merely referring to the table.

Method of computing the weighted score.-- A norm table (Table 3) was constructed using step intervals equivalent to one-third sigma on each test. The mean was placed at a standard score of 500 (50%), and given a letter "grade" of C. Plus one sigma equals B; plus two sigmas equals A. Minus one sigma is D, and minus two sigmas, E. It was decided that each "grade" range should cover one standarddeviation. This means that a score which fell between 34% and 62% (standard scores of 466-533) would receive a "grade" of C. These letter grades, in turn, were converted to numerical values: A-5, B-4, C-3, D-2, and E-1. By first referring to the

table and finding the "grade" for each test, then converting them to their numerical equivalents and adding the four weights together, a total weighted score is obtained.

Table 3. Tentative Norms for Experimental Battery

Stan. Score	%ile Rank	Adapt.	Minn.Cl. Names	Names % of Error	Class. -N	Grade & Wt.
700	98	22	180	0	24	
666	95	21	172	.99	22	A-5
633	91	19	164	1	20	
600	84	18	156	2	17	B-4
566	75	17	148	3	15	
533	63	16	140	4	13	
500	50	14	132	5	11	C-3
466	37	12	124	6	8	
433	25	11	116	7	6	
400	16	10	107	8	4	D-2
366	9	9	99	9	2	
333	5	8	91	10	1	
300	2	6	83	11	1	E-1
266	1	5	75	12	0	F-0

For the sake of clarity, the following example is given: M.G.'s scores on the four tests were as follows: Adaptability, 21; Minnesota (Speed), 161; Minnesota, Error, 2.9; Classification-N, 29. By using the norm table it may be seen that her grades, in order, are A-5, B-4, B-4, A-5. These added together equal 18, which is her total weighted score for the battery.

The value of the weighted score.-- It is the weighted score which is to be used instead of the index for the critical score. Comparison of indexes with the weighted scores showed that differences, if any, were not statistically significant. The weighted score system is more easily understood by the layman and can be more quickly computed. These are important advantages from an industrial point of view. It is less complicated, yet almost as accurate a method as that of the formula-derived index and has, therefore, been adopted. Figure 5 is a graphic presentation of the average weighted scores of each rating group. Figure 6 is a composite graph which includes a comparison of the averages of each group on all tests in the battery and the weighted-score average of each group according to the supervisor's ratings. The significant differences between the means is at once apparent.

In Table 4, the initials of the workers have been used so as to show the relative position of each individual within her rate classification according to her average weighted score. For the sake of comparison, each person's index is also given, and group averages are indicated at the bottom of the appropriate columns.

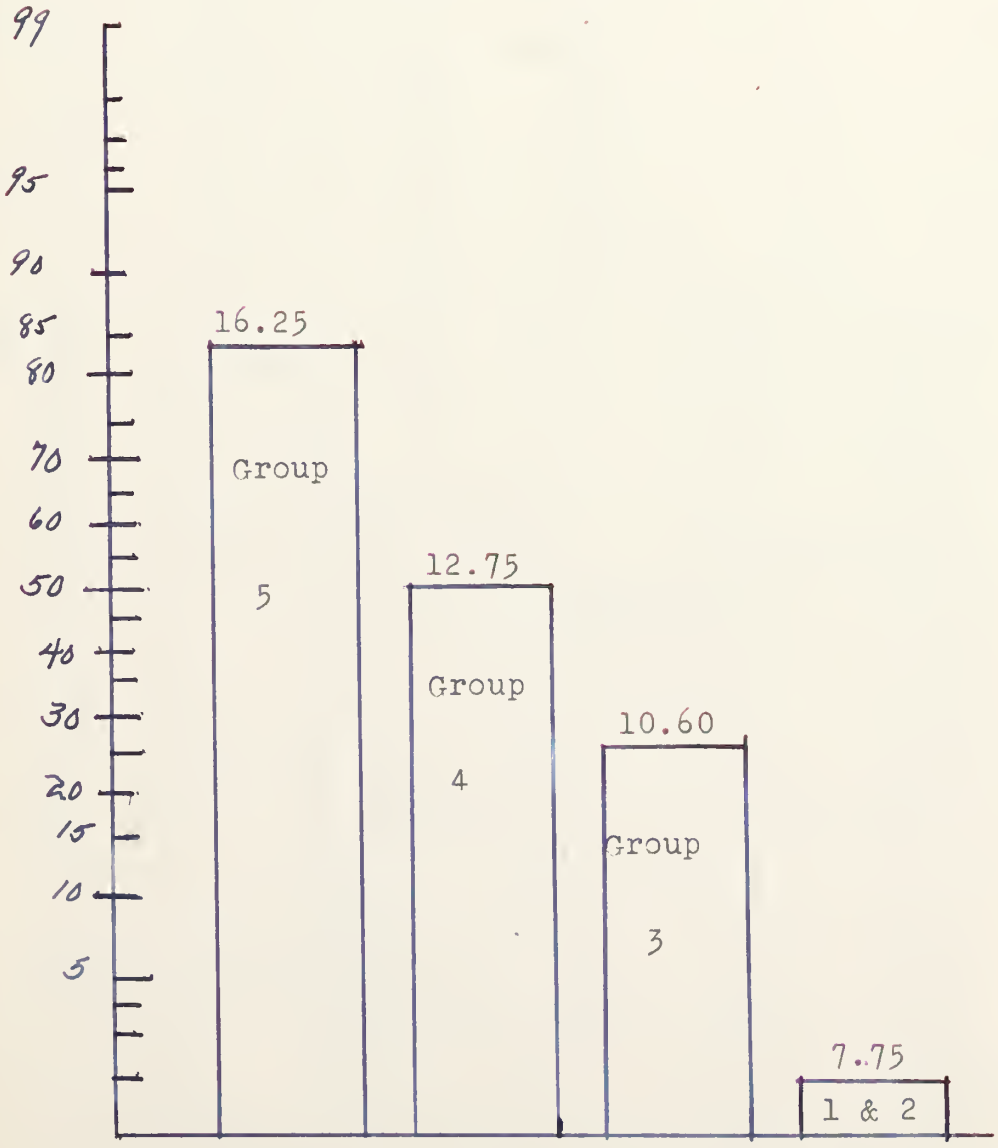

Fig. 5 -- Average weighted scores of workers rated 5, 4, 3, and 1 & 2.

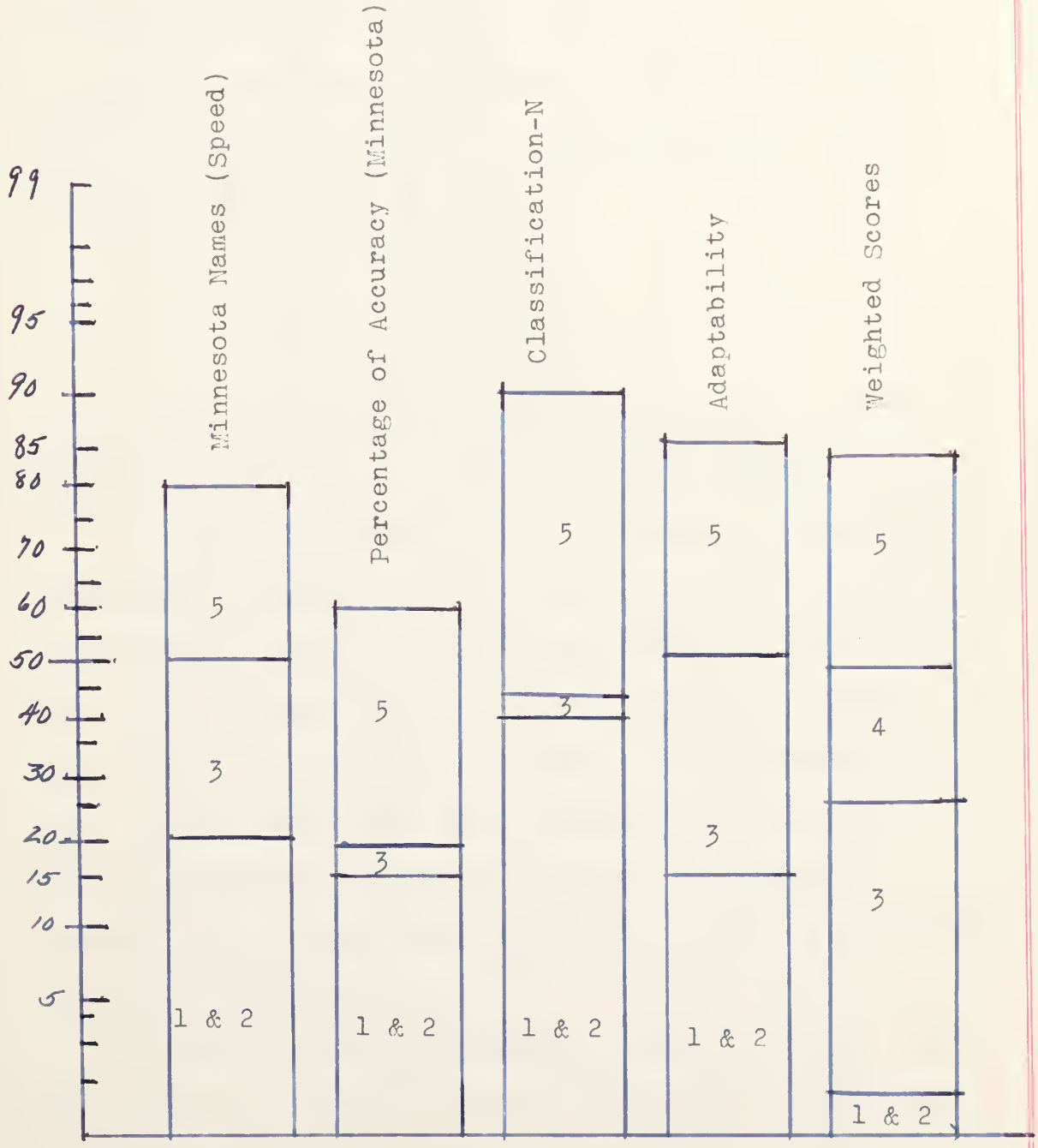

Fig. 6 -- Average scores on all tests in battery for workers rated 5, 3, 1 & 2; average weighted scores of groups rated 5, 4, 3, and 1 & 2.

Table 4. Workers Ranked within Rating Classifications according to Weighted Scores; Each Person's Index, and the Average Weighted Score for Each Group

5			4			3			2			1		
NA	WS	IND	NA	WS	IND	NA	WS	IND	NA	WS	IND	NA	WS	IND
MG	18	6.17	CH	15	4.99	EK	16	5.30	HO	9	3.02	MC	9	2.59
LH	17	5.67	OT	14	4.66	MB	14	4.46	FM	8	2.60	BM	5	1.85
MM	15	4.75	BH	12	3.85	GB	12	4.00						
PM	15	4.73	MK	10	2.60	DM	11	3.68						
						EW	11	3.25						
						VG	10	2.51						
						AT	9	2.88						
						KM	9	2.57						
						MS	7	2.71						
						BT	7	2.48						
Av. 16.25			12.75			10.6			(8.5)		7.75	(7.0)		

It should be noted that the difference between the averages of the high and the low groups is 8.5 points, and that the average score of each group is directly in line with the supervisor's ratings. There are a few cases out of line and one, MK, who is very much out of line. Although in some cases, persons with fair to high supervisor's ratings did not get a comparable weighted score, there is no case of a low-rated individual receiving a high one.

A tentative critical weighted score of ten has been set. (The use of this critical score will be explained in Chapter V.) Had these test results been in actual use, all of those now rated one and two would have been eliminated; four average workers lost.

Statistics on Judges' Ratings

Correlations of all judges' ratings with the weighted scores.-- Earlier in this study, it was reported that although four judges' ratings were obtained, only one, the office manager's, was considered valid and was, therefore, the only one used as the criterion. As a matter of interest, however, correlations have been drawn between each judge's rating and the total weighted scores. These are given in Table 5.

Table 5. Correlations of Judges' Ratings with Average Weighted Scores

Rater	r
Office Manager	.79
Personnel Manager	.44
Assistant Personnel Manager	.38
President of the Company	.34

There is such a discrepancy between the office manager's rating and that of any other rater that the usual procedure of averaging the ratings would have probably resulted only in introducing moer error.

Correlations drawn with office manager's ratings.-- It may be recalled that the office manager rated the experimental group before the tests were given and three months later. The correlation between his second rating and the total weighted scores was .71, while his first ratings correlated .79. The correlation between the

"before-and-after" ratings is .85. Although not conclusive by any means, the fact that there is evidence of reliability in the rating and that both first and second correlations are statistieally significant warrants the belief that the statistics derived in the experiment are probably valid.

Summary

By the process of rank-order correlation, four statistically significant tests whose R with the rating is .81 - .053, were incorporated into a test battery. The four tests are:

Minnesota Names Section (Speed)
Minnesota Names, Percentage of Error
Classification-N
Adaptability Test

By means of a regression equation, a formula for deriving an index was established. For practical purposes, however, such a scoring system was considered too complicated and so a method of weighted scores was devised. Differences between weighted scores and indexes are not statistically significant. A tentative total weighted score of ten was decided upon.

Although admittedly not the best criterion, an analysis of the office manager's rating showed that it is probably as reliable and as valid as a subjective rating can be.

CHAPTER V

GENERAL SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

General Summary

The problem.-- The problem involved in this service study has been to take the preliminary steps towards the establishment of a pre-employment test battery for selecting clerical workers in a New England factory. A study of the work done by the clerical force showed that all workers needed common skills and attributes to do their work satisfactorily. Investigation also revealed that only a very few positions required any specialized training, and that the majority of workers were trained on the job.

Related material.-- The literature on the subject of clerical testing discloses that many companies have used psychological tests successfully in hiring clerical workers. The large majority use a combination of clerical aptitude and intelligence tests, giving achievement tests when special skill is required.

The method used.-- Working on the basic assumption that an industrial testing program should be "tailor-made", an experimental group of tests was administered

with the end in view of culling the most significant. The tests selected met the criteria of brevity, ease of administration, measurement of aptitude, and good construction.

The criterion.-- The criterion used for determining the effectiveness of the tests was the office manager's rating of each employee on a five-point scale. The pitfalls of such a criterion are recognized, but no more objective data were available. The ratings were subjected to close scrutiny, and, as ratings go, seem to be fairly reliable and valid.

Statistical treatment.-- Using the rank-order method, correlations were drawn for each test, subtest, and the percent of error on the two sections of the Minnesota test. Those found to be the most statistically significant were intercorrelated and a battery consisting of the following four tests was evolved:

Minnesota Vocational Test for Clerical Workers, Names

Percent of Error on the Minnesota, Names

Number Classification of the Test of Clerical Competence

Adaptability Test

The R with the office manager's rating as computed by the Doolittle method is .81 $\pm$ .053, which is statistically significant and has twice the predictive value of any one test used alone. Graphs were drawn

which illustrate the discriminative value of the tests.

By means of a regression equation, a formula for deriving an index of the four scores was established. Inasmuch as the use of this formula is a little complicated, a method for determining weighted scores was devised. Differences, if any, between weighted scores and indexes were not statistically significant and therefore it is this weighted score system which is to be used in the employment office.

In every case, those workers with low ratings (one and two) had low weighted scores. There was no case of a person with a high rating receiving a weighted score below ten and so the critical score has been placed tentatively at this figure. There are three reasons for setting a tentative rather than a definite critical score.

1. Although all of those with one and two ratings fall below this level, there are four rated three who do also.

2. There is no way yet of measuring how much "practice" effect is involved in this experimental group. Hay's and Blakemore's study indicates that clerical experience may have some effect on test scores. (32:311)

3. The number of cases in the experiment, (22), is too small to warrant unconditional acceptance of its

findings.

Conclusions

In spite of the limitations of (a) the small number of cases and (b) the lack of an objective criterion, the results of the study seem to indicate that the tests statistically selected and used as a battery distinguish quite clearly the good clerical workers from the poor ones now employed at Company X.

It must be clearly understood that this experiment has not been an end in itself, but rather a means to an end. The ultimate aim is the development of an efficient method for selecting competent clerical workers. This test battery at this stage merely indicates how the tests discriminate those already employed. Its value as a selective instrument can be determined only by using it experimentally with new employees. A follow-up program to prove (or disprove) the efficacy of the battery, then, is essential.

Recommendations

In order to achieve worthwhile results, the following procedure is recommended:

1. All new applicants for clerical work should be employed in accordance with regularly established procedures.

2. Tests should be given to new employees, but the results should have no bearing on the hiring.

3. After a sufficient number of new people have been hired, the test results should be reviewed and the value of the battery ascertained. For purposes of comparison, a tentative norm table has been constructed.

4. If during the follow-up period the battery proves valid, definite critical scores should be established.

Concluding Remarks

In conclusion, there are three points which should be mentioned in connection with the use of psychological tests by the employment office. These points do not grow out of this study but they are, nevertheless, pertinent to it.

1. Test results should never be used as the sole basis for hiring. A test battery such as used in this experiment does not pretend to measure all the factors involved in the successful clerical worker. It can be valuable only when used wisely to supplement the interview and other data.

2. The selective rather than the placement function of tests has been emphasized in this experiment. The material here included might well serve also as a placement aid, and should be studied carefully from that

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point of view.

3. It must be remembered that the value of the best possible selection methods can be nullified if opportunity for proper and adequate training is not provided.

APPENDIX A

TESTS USED IN THIS STUDY

The Adaptability Test

The Minnesota Vocational Test for Clerical Workers

The Test of Clerical Competence

Survey of Working Speed and Accuracy

FORM **B**

ADAPTABILITY TEST

by
JOSEPH TIFFIN, Ph. D.
and
C. H. LAWSHE, Ph. D.
Division of Education and Applied Psychology
PURDUE UNIVERSITY

SCORE _____ PERCENTILE _____

DATE _____

NAME _____ (First) _____ (Last) _____

Some jobs require figuring—such as adding, subtracting, multiplying, and dividing—while others require writing reports or answering letters, and still other jobs can be done well by people who are not particularly apt with figures or words. This test will help in determining how well you can handle jobs that require these abilities.

Do as well as you can on this test, but do not worry about it. Remember that you may be well qualified for certain jobs that require training or skills different from those covered in this test.

HERE IS A SAMPLE QUESTION:

Which of the words below tells what an orange is?

(1) animal (2) flower (3) fruit (4) vegetable (5) cloth.....(3)

The correct answer is "fruit". Since the word "fruit" is number (3), the number (3) has been written in the blank space at the right.

NOW LOOK AT THIS QUESTION:

What is the seventh letter in the alphabet? .....(G)

The seventh letter in the alphabet is G, so the letter G has been written in the blank at the right.

NOW, WRITE THE ANSWER TO THIS QUESTION YOURSELF:

If one pencil costs 5c, how many cents will six pencils cost? .....(_____)

The answer to this question is 30, so you should have written the number 30 in the blank at the end of the question.

TRY THIS ONE:

What is the first letter of a three letter word meaning a tool used by carpenters to cut wood? .....(_____)

The word of course is "saw", so the letter S should be written in the blank at the end of the question.

All of the questions in this test are similar in form to those given above.

REMEMBER:

1. If the answer to a question is a LETTER or a NUMBER, write the letter or number in the blank at the end of the question.
2. If several answers are suggested (as in the first question above), write the NUMBER of the correct answer in the blank at the end of the question.

Work as rapidly as you can without making unnecessary mistakes. You will not be able to answer all of the questions. When you find a question you cannot answer, do not spend too much time on it, but go on to the next question. Do not skip around, but take all of the problems in order.

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DO NOT TURN THE PAGE UNTIL TOLD TO DO SO

44-4-15 REV.

1 How many hours will it take a person to go 77 miles at the rate of 7 miles an hour? ..... (_____)

2. *Machines* are to *a plant* as *counters* are to:
(1) clerks (2) salesmen (3) stores (4) merchandise (5) floorwalkers ..... (_____)

3. In the following series of numbers, how many times does 5 follow 7?
2 7 5 4 7 5 6 7 5 5 8 3 7 5 ..... (_____)

4. Which of the five proverbs below means the same as, "The first man there usually succeeds"?
(1) A penny saved is a penny earned. (2) Seek and ye shall find. (3) The early bird catches the worm. (4) Rising early makes for good health. (5) Never look a gift horse in the mouth ..... (_____)

5. If two pieces of candy cost 5 cents, how many pieces of candy can be bought for 25 cents? ..... (_____)

6. A *typewriter* is to *a stenographer* as *a trowel* is to *a*:
(1) carpenter (2) mason (3) machinist (4) pipefitter (5) welder ..... (_____)

7. *Heat* is to *burn* as *cold* is to:
(1) ice (2) freeze (3) temperature (4) boil (5) weather ..... (_____)

8. A truck gets 8 miles per gallon of gas empty and 6 miles per gallon loaded. It travels empty to a point 96 miles away and returns with a full load. How many gallons of gas does it use? ..... (_____)

9. If the words below were arranged to make the best sentence, with what letter would the last word of the statement end?
trade a requires learning of years experience ..... (_____)

10. A man won $50 at a bank night drawing. If he spends it at the rate of $1.25 per week how many weeks will the money last? ..... (_____)

11. If the words below were arranged to make the best sentence, with what letter would the last word in the sentence begin?
foreman men by liked a is his good ..... (_____)

12. Mary is twelve years old. Mary is twice as old as Helen was three years ago. How old is Helen? ..... (_____)

13. Which of the following pairs of words have the SAME meaning?
(1) monotony—variety (2) desist—persevere (3) many—few (4) expel—eject (5) remote—near ..... (_____)

14. John has $90. Henry has 2/3 as much as John. George has 1/2 as much as Henry. How many dollars do they have together? ..... (_____)

15. *Switch* is to *light* as *faucet* is to:
(1) pipe (2) plumber (3) sink (4) bath (5) water ..... (_____)

16. What letter in the sentence you are now reading appears a second time nearest the beginning? ..... (_____)

17. Which two letters in the word GOLD have the same number of letters between them in the word as in the alphabet? ..... (_____)

18. If a piece of cloth twelve inches long shrinks to eleven inches when washed, how many inches long will a 96 inch piece be after washing? ..... (_____)

19. Five percent of $2000 is the same as 10 percent of what amount? ..... (_____)

20. A club held 9 meetings this month or 2¼ times as many as last month. How many times did the club meet last month? ..... (_____)

21. What is the first letter of an eight letter word meaning return on money loaned? ..... (_____)

22. Which two letters in the word MAKE have the same number of letters between them in the word as in the alphabet? ..... (_____)

23. If the first two of the following statements are true, the third is (?). All doctors have gone to medical school. Jones went to medical school. Jones is a doctor.
    (1) true (2) false (3) not certain ..... (_____)

24. A man missed 6 hours of work because of illness but worked ¾ of his time. How much would he have worked if he had not been sick? ..... (_____)

25. If the first two of the following statements are true, the third is (?). Fresh air is essential to health. Harry has plenty of fresh air. Harry is healthy.
    (1) true (2) false (3) not certain ..... (_____)

26. What number is missing in this series?
    7 — 10 — 15 — 22 — 31 — (?) ..... (_____)

27. Which of the following pairs of words have OPPOSITE meanings?
    (1) quell—subdue (2) wax—wane (3) compute—calculate
    (4) quick—hasty (5) dignified—stately ..... (_____)

28. A man has $80. The first day he spends half of this amount. On each day thereafter he spends half of what he had at the beginning of the day.
    How many dollars does he have left at the beginning of the seventh day? ..... (_____)

29. What number is missing in this series?
    36 — 18 — 6 — 3 — 1 — (?) ..... (_____)

30. How many printed capital letters are there in the alphabet which look the same when seen directly as when seen reflected from a mirror? ..... (_____)

31. What is the maximum number of areas that can be formed by drawing three straight lines through a circle? ..... (_____)

32. The hands of a clock seen in a mirror appear to be at the approximate position they would be at 2:35. What time is it? ..... (_____)

33. What is the second letter of a nine letter word beginning with "F" and meaning "to baffle or defeat"? ..... (_____)

34. What number is missing in this series?
    8 — 12 — 18 — 27 — 40½ — (?) ..... (_____)

35. You have a nickel, a dime, a quarter, and a fifty cent piece. A clerk shows you several articles, each a different price and any one of which you could purchase with your coins without receiving change. What is the largest number of articles he could have shown you? ..... (_____)

MINNESOTA VOCATIONAL TEST FOR CLERICAL WORKERS

(Arranged by Dorothy M. Andrew under the direction of Donald G. Paterson and Howard P. Longstaff)

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Name_____ Date_____

TEST 1—Number Comparison	TEST 2—Name Comparison
Number Right_____	Number Right_____
Number Wrong_____	Number Wrong_____
Score = R—W_____	Score = R—W_____
Percentile Rating_____	Percentile Rating_____

Instructions

On the inside pages there are two tests. One of the tests consists of pairs of names and the other of pairs of numbers. If the two names or the two numbers of a pair are *exactly the same* make a check mark (√) on the line between them; if they are *different,* make no mark on that line. When the examiner says "Stop!" draw a line under the last pair at which you have looked.

Samples done correctly of pairs of *Numbers*

79542		79524
5794367	√	5794367

Samples done correctly of pairs of *Names*

John C. Linder		John C. Lender
Investors Syndicate	√	Investors Syndicate

Now try the samples below.

66273894		66273984
527384578		527384578
New York World		New York World
Cargill Grain Co.		Cargil Grain Co.

This is a test for Speed and Accuracy. Work as fast as you can without making mistakes.

Do not turn this page until you are told to begin.

Printed in U.S.A.

Test 1

√ Check if the two numbers are the same.

1. 307——309
2. 4605——4603
3. 976——996
4. 101267——101267
5. 3065432——30965432
6. 103345700——103345700
7. 46754——466754
8. 3367490——3367490
9. 2779——2778
10. 57394——57394
11. 63801829374——63801839474
12. 283577657——283577657
13. 75689——75689
14. 2547892026——2547893026
15. 336354——336254
16. 998745732——998745733
17. 623——623
18. 263849102983——263849102983
19. 5870——5870
20. 379012——379012
21. 8734629——8734629
22. 2549806746——2549806746
23. 57802564——57892564
24. 689246——688246
25. 1578024683——1578024683
26. 582039485618——582039485618
27. 63829172630——63829172639
28. 592——592
29. 829374820——829374820
30. 62937456——63937456
31. 8293——8293
32. 6382910293——6382910292
33. 781928374012——781928374912
34. 68293——68393
35. 18203649271——18293649271
36. 4820384——4820384
37. 283019283745——283019283745
38. 73927102——73927102
39. 91029354829——91029354829
40. 38291728——38291728
41. 6283910293——6283910203
42. 392018273648——392018273848
43. 820——829
44. 572937273——572937373
45. 7392——7392
46. 8172036——8172036
47. 68391028364——68391028394
48. 48293——48292
49. 739201——739201
50. 62839201——62839211
51. 5829——5820
52. 192836472829——192836472829
53. 362——362
54. 2039271827——2039276837
55. 73829——73829
56. 82739102837——82739102837
57. 48891028——48891028
58. 7291728——7291928
59. 172839102839——172839102839
60. 628192——628102
61. 473829432——473829432
62. 478——478
63. 372816253902——372816252902
64. 64829——64830
65. 4739210249——4739210249
66. 748362——748363
67. 728354792——728354772
68. 3927——3927
69. 927384625——927384625
70. 4628156——4628158
71. 6382——6392
72. 12937453829——12937453829
73. 523——533
74. 7263920——7263920
75. 74293——74293
76. 82734291——82734271
77. 2739102637——2739102637
78. 62810263849——62810263846
79. 638291——638291
80. 62831027——62831027
81. 527——529
82. 172438291026——172438291026
83. 7253829142——725382942
84. 836287——836289
85. 62435162839——62435162839
86. 6254——6256
87. 6241526——6241526
88. 1426389012——1426389102
89. 825——825
90. 67253917287——67253917287
91. 6271——6271
92. 263819253627——263819253629
93. 82637——82937
94. 728392736——728392736
95. 62739——62739
96. 728352689——728352688
97. 463728——463728
98. 73829176——73827196
99. 4825367——4825369
100. 56382018——56382018

√ Check if the two numbers are the same.

101. 789———789
102. 819263728192———819263728172
103. 682537289———682537298
104. 7245———7245
105. 82936542891———82936542891
106. 4738267———4738277
107. 63728———63729
108. 6283628901———6283628991
109. 918264———918264
110. 263728192037———263728192073

111. 52839102738———5283910238
112. 6283———6282
113. 7283529152———7283529152
114. 208———298
115. 82637201927———8263720127
116. 15273826———15273826
117. 72537———73537
118. 726391027384———726391027384
119. 627389———627399
120. 725382910———725382910

121. 46273———46273
122. 629———620
123. 7382517283———7382517283
124. 637281———639281
125. 2738261———2728261
126. 627152637490———627152637490
127. 73526189———73526189
128. 5372———5392
129. 63728142———63728124
130. 4783946———4783046

131. 82637281028———82637281028
132. 628———628
133. 7293728172———7293728177
134. 7362———7362
135. 927382615———927382615
136. 85345———85345
137. 895643278———895643277
138. 726352———726353
139. 7263524———7263524
140. 632685———632685

141. 273648293048———273648293048
142. 634———634
143. 7362536478———7362536478
144. 7362———7363
145. 7362819273———7362819273
146. 63728———63738
147. 63728192637———63728192639
148. 728———738
149. 62738291527———62738291529
150. 63728192———63728192

151. 73526———73526
152. 7283627189———7283627189
153. 627———637
154. 728352617283———728352617282
155. 6281———6381
156. 936271826———936371826
157. 82637192037———82637192037
158. 527182———527182
159. 6273———6273
160. 726354256———72635456

161. 725361552637———725361555637
162. 7526378———7526377
163. 685———685
164. 82637481028———82637481028
165. 3427———3429
166. 827364933251———827364933351
167. 63728———63728
168. 6273846273———6273846293
169. 62836———6283
170. 2638496———2638496

171. 738291627874———738291627874
172. 62836454———62836455
173. 42738267———42738269
174. 573829———573829
175. 628364728———628364928
176. 725———735
177. 627385———627383
178. 63354———63354
179. 54283902———54283602
180. 7283562781———7283562781

181. 62738———63738
182. 727355542321———72735542321
183. 263849332———263849332
184. 162837———163837
185. 47382912———47382922
186. 628367299———628367399
187. 111———111
188. 11829304829———11828304829
189. 4448———4448
190. 333693678———333693678

191. 3212———3212
192. 27389223678———27389223678
193. 473829———473829
194. 7382937———7383937
195. 3628901223———3628901233
196. 5572867———5572867
197. 87263543———87263543
198. 3678902———3678892
199. 15672839———15672839
200. 9927382———9927382

Test 2

√ Check if the two names are the same.

1. Hulme Co.——Hulne Co.
2. L. T. Piver——L. T. Piver
3. Foley & Co.——Foley & Co.
4. Floyd Gibbons——Floyd Gibbens
5. Dole Publishing Co.——Dole Publishing Co.
6. Chase Bag Co.——Chase Bag Co.
7. Aladdin Co.——Aladdin & Co.
8. Arthur Bier & Co.——Arthur Bier Co.
9. Mydall Cain——Mydell Cain
10. M. C. D. Borden & Sons——M. C. D. Borden & Sons
11. Midland Nat'l. Bank——Midland Nat'l. Bank
12. Hixon Lt'd.——Hixon Lt'd.
13. R. Weiner——R. Wiener
14. Pacqueres——Pacqueris
15. Ponemah Mills——Ponemah Mills
16. Keeley Institute——Keeley's Institute
17. Jim Pepper——Jim Pepper
18. Pictorial Review——Pictorial Review
19. Colette Cartier——Colete Cartier
20. Mayno Salon——Mayno's Salon
21. Glazo Co.——Glazo Inc.
22. Bonne Lee——Bonne & Lee
23. Vapo Cresolene Co.——Vapo Cresolen Co.
24. Wiebusch & Helger——Weibusch & Helger
25. A. M. Davis——A. M. Davis
26. Foote Lb'r. Co.——Foot Lb'r. Co.
27. Lander's——Lander's
28. Delle Ross——Dell Ross
29. Savage Rug Co.——Savage Rug Co.
30. Landon & Warner——Landen & Warner
31. Dennison's——Dennison's
32. Piggily Wiggily Co.——Piggily Wiggily Co.
33. Hurley Machine Co.——Hurly Machine Co.
34. J. Bauer & Black——J. Baeur & Black
35. Edwin Cigar Co.——Edwin Cigar Co.
36. Vik Oil Co.——Vik Oil Co.
37. John Skinner & Sons——John Skinner & Son
38. Eagle Pencil Co.——Eagle Pencil Co.
39. Hudson Bros.——Hudson Bros.
40. D. M. Ferry & Co.——D. M. Ferry Co.
41. Johnsen A. J.——Johnson A. J.
42. Todd & Son——Todd & Sons
43. Merrill Palmer——Merrill Palmer
44. T. Cook & Son——T. Cook & Son
45. Funk & Wagnall——Funk & Wagnull
46. F. H. Vizetelly——F. H. Vizitelly
47. Higgen & Co.——Higgin & Co.
48. Bert Cooksley——Bert Cooksley
49. W. C. Wadsworth Co.——W. C. Wadworth Co.
50. Alvah Bushnell——Alvah Bushnell
51. Armo Culvert Co.——Armo Culvert & Co.
52. Larous & Bro.——Larus & Bro.
53. Winstar W. B.——Winster W. B.
54. Bender L. C.——Binder L. C.
55. J. C. Andresen Inc.——J. C. Andresen Inc.
56. Vacuum Oil Company——Vacuum Oil Company
57. Endicott Co.——Endicott Co.
58. Minneapolis Mf'g. Co.——Minneapolis Mf'g. Co.
59. Beverly A. B.——Beverley A. B.
60. Jensen & Co.——Jenson & Co.
61. Meumann L. R.——Meumann L. R.
62. Stevenson & Co.——Stevenson & Co.
63. Haldoran H. P.——Haldoran H. P.
64. Evers Bros.——Evers Bros.
65. Nevens Sales Co.——Nevens Sale Co.
66. Outdoor Sign Co.——Outdoor Sign Co.
67. Young & Co.——Young & Co.
68. Goodyear Tire Co.——Goodyear Tire Co.
69. Redford Lb'r. Co.——Redferd Lb'r. Co.
70. Canadian National——Canadian Nat'l.
71. Standard Oil Co.——Standard Oil Co.
72. Valiant Mf'g. Co.——Valant Mf'g. Co.
73. C. Harris——C. Harris
74. J. Williams Company——G. Williams Company
75. Kaufmann A. C.——Kaufman A. C.
76. Frisby N. C.——Frisby N. C.
77. Donald T. C.——Donald T. C.
78. Waldo Inc.——Waldo Co.
79. Andres Mfg. Co.——Andres Mfg. Co.
80. Oriza Ann Legrand——Oriza Anne Legrand
81. A. Stein & Company——A. Stien & Company
82. Robert Courtney——Robert S. Courtney
83. Leonard Music Co.——Leonard Music Co.
84. George Morgan——George Morgen
85. Paulson's Cafe——Paulson's Cafe
86. Robert T. Quamme——Robert T. Quame
87. Traverse Studio——Traverse Studio
88. Upton Grain Co.——Upten Grain Co.
89. E. E. Atkinson——E. E. Atkinson
90. Zeisler Furrier——Ziesler Furrier
91. E. G. Kenyon——E. G. Kenyon
92. Backus, Roy——Backus, Ray
93. Carpenter Steel Co.——Carpenter Steel Co.
94. W. E. Davenport——W. E. Davanport
95. John Kingsley——John G. Kingsley
96. Lane Inc.——Lane Inc.
97. T. G. Lentingworth——T. G. Lentinworth
98. Elizabeth Bennett——Elizabeth Bennett
99. Charibel——Claribel
100. R. C. A. Victor Company——R. C. A. Victer Company

√ Check if the two names are the same.

101. Crane Ltd.——Crane Co.
102. Isaac F. Marcosson——Isaac F. Marcoson
103. Stromberg Carlson——Stromberg Carlsen
104. W. A. Evans——W. A. Evans
105. Mason Tile Co.——Matson Tile Co.
106. Clark Frame Co.——Clark Frame Co.
107. William G. Kellogg——William P. Kellogg
108. Berwind Briquets——Berwind Briquets
109. F. W. Bronson——F. W. Bronson
110. Nash Motors——Nash Motor

111. C. E. Locke——C. E. Lock
112. Mazer Cressman Co.——Mazer Cressmon Co.
113. Leslie Thrasher——Leslie Thrasher
114. Plough Inc.——Plough Lt'd.
115. Walpole——Wallpole
116. John Hergesheim——John Hergesheimer
117. Hudson Bay & Co. Ltd.——Hudson Bay Co. Ltd.
118. Lassco Co.——Lassko Co.
119. Albert Mills——Albert Mill
120. Yale Stores——Yale Store

121. Bob Fairbanks——Bob Fairbanks
122. Denton Products——Denten Products
123. Wells Dickey Co.——Wells Dickey Inc.
124. S. N. Jonas——S. N. Jonus
125. Warren Co.——Warren Co.
126. Kelly Transfer——Kelly Transfer
127. S. Karpen & Brothers——S. Karpen & Brothers
128. A. J. Drexel——A. J. Drexel
129. C. H. Salmon——S. H. Salmon
130. H. Simons Lbr. Co.——H. Simons Lbr. Co.

131. Villaume Lbr. Co.——Villaum Lbr. Co.
132. Banett Company——Banett Company
133. B. B. Quinn——B. B. Quinn
134. Beauville Co.——Beauxville Co.
135. Gordon Mfg. Co.——Gordon Mfg. Co.
136. Curtis Mill Co.——Curtis Mill Co.
137. S. Jacobs & Company——S. Jacobs & Company
138. W. Morton——W. Morten
139. F. D. Prescott——F. D. Prescott
140. Old Gold——Old Gold

141. Jones Inc.——Jones Bros.
142. Petropalm & Son Inc.——Petropalm & Son Inc.
143. Palmers Ltd.——Palmers Ltd.
144. Higgin Mfg. Co.——Higgen Mfg. Co.
145. Lehigh Coal Sales——Lehigh Coal Sales
146. Buick Motor Co.——Buick Motors Co.
147. George Carpenter——George Carpentier
148. H. H. Hemenway——H. H. Hememway
149. M. A. Gladding——M. A. Gladding
150. F. J. Cheney & Co.——F. J. Cheney & Co.

151. H. J. Heinz——H. J. Hienz
152. National City Co.——National City Co.
153. Dorothy Gray——Dorothy Gray
154. Reinhard Brothers——Reinhart Brothers
155. Oscar Bye——Oscar Bye
156. Ben Coal Co.——Ben Coal Co.
157. C. Lundstrom Mfg. Co.——C. Lundstrom Mfg. Co.
158. J. C. McKesson Drug Co.——J. C. MacKesson Drug Co.
159. Waite Coal Co.——Wait Coal Co.
160. Berry Brothers——Berry Brothers

161. J. Coty Co.——J. Coty Co.
162. F. R. Connell——F. R. Connell
163. Dr. Miles Company——Dr. Mills Company
164. Northam Warrer——Northam Warren
165. Indian Refining Co.——Indian Refining Co.
166. Jack Richard——Jack Richard
167. Kirsch Mfg. Co.——Kiresh Mfg. Co.
168. Jack Wachter——Jack Wachter
169. C. M. Stend——C. M. Stent
170. John Blassingham——John Blassingham

171. W. W. Brock——W. W. Brock
172. L. Waterman Company——L. Watermon Company
173. F. H. Weaver——F. P. Weaver
174. Multistamp Co., Inc.——Multistamp Co., Inc.
175. Sani-flush——Sani-flush
176. Tung Sol Lamp Inc.——Tung Sul Lamp Inc.
177. F. J. Suderman——F. J. Suderman
178. Theo. Audel & Co.——Theo. Audel Co.
179. Cox Realtors——Cox Realtors
180. Kellogg Company——Kellogg Company

181. Ann Lowe——Anna Lowe
182. A. Cederstrand & Son——A. Cedarstrand & Son
183. Marschke Co.——Marsckhe Co.
184. Collum & Ackerman——Collum & Ackerman
185. Insulite Co.——Insulite Co.
186. General Steel Co.——General Steel Co.
187. Charles Von Buelow——Charles Von Beulow
188. A. D. Beaudette——A. D. Beaudette
189. Firestone Tire Co.——Firestone Tire Co.
190. Foxsworth & Son——Foxsworth & Son

191. A. S. Hinds Co.——A. S. Hinds Co.
192. Charles Beardslee——Charles Beardslee
193. Axton Tobacco Co.——Axeton Tobacco Co.
194. Inso Board Co.——Inso Board Co.
195. Stanley Russell——Stanley Russell
196. Babson Mfg. Co.——Babsen Mfg. Co.
197. Bodee Institute——Bodee Institute
198. Greer College——Greer College
199. Lampland Lbr. Co.——Lamplund Lbr. Co.
200. Bird & Son Inc.——Bird & Sons Inc.

Cardall-Gilbert

TEST OF CLERICAL COMPETENCE

by

ALFRED J. CARDALL, *M. B. A., Ed. D.*
Consulting Industrial Psychologist

and

JANE GILBERT
Test Supervisor
Johnson & Johnson
Gas Mask Division

NAME _____

GROUP _____ **AGE** _____

_____

DATE _____

		SCORE	PERCENTILE
1. Checking (numbers)	—N	_____	_____
2. Checking (verbal)	—V	_____	_____
3. Classification	—V	_____	_____
4. Classification	—N	_____	_____
5. TOTAL		_____	_____

Published by

TEST SERVICE DIVISION

SCIENCE RESEARCH ASSOCIATES

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Alfred J. Cardall and Jane Gilbert

CHECKING-N

Below is a written list of figures and a typed list of figures. If the numbers opposite each other in the two columns are the same, make a check mark in the space provided opposite the typed figures. If they are different, make no mark.

1.	229157	229157	1.
2.	8330	8330	2.
3.	342815	342815	3.
4.	109890	109890	4.
5.	4817	4817	5.
6.	378496	378694	6.
7.	36785	36785	7.
8.	161315	161513	8.
9.	192724	129274	9.
10.	1397	1397	10.
11.	917	197	11.
12.	13513	13153	12.
13.	5141	4151	13.
14.	43345	43345	14.
15.	812	812	15.
16.	542464	542646	16.
17.	4437	4437	17.
18.	6251	5261	18.
19.	698928	698982	19.
20.	315027	315072	20.
21.	227334	224337	21.
22.	86539	86359	22.
23.	952841	952841	23.
24.	874	784	24.
25.	25050	25050	25.
26.	5654	5456	26.
27	128182	128182	27.
28.	471362	471263	28.
29	2727476	2727674	29.
30	237330	237330	30.
31	66493	66493	31.
32	749523	749523	32.
33	29157	29157	33.
34	1342	1432	34.
35.	472788	478728	35.
36	1477835	1477835	36.
37	9127	9217	37.
38	34196	34196	38.
39	667484	667848	39.
40	215	215	40.
41	25458	25458	41.
42	42589	42859	42.
43.	1080374	1080374	43.
44.	265	256	44.
45.	25421	24521	45.
46.	2977	2977	46.
47.	597	579	47.
48.	335866	665833	48.
49.	31845	31854	49.
50.	528439	528349	50.
51.	4423	4432	51.
52.	638	638	52.
53.	105960	105690	53.
54.	10071	17001	54.
55.	6185167	6185167	55.
56.	582902	582902	56.
57.	175	157	57.
58.	6617	6617	58.
59.	47232	42732	59.
60.	954714	954714	60.
61.	5959	9595	61.
62.	26357	26357	62.
63.	2457314	2457413	63.
64.	730785	730785	64.
65.	21989	21989	65.
66.	210148	210148	66.
67.	12725	12725	67.
68.	31088	31088	68.
69.	137393	139373	69.
70.	8105	8015	70.
71.	115188	115188	71.
72.	76924	79624	72.
73.	5769	5796	73.
74.	620417	620714	74.
75.	173306	173306	75.
76.	74518	74518	76.
77.	1062	1062	77.
78.	2081008	2008108	78.
79.	26807	26708	79.
80.	225562	225562	80.
81	42186	42168	81.
82	12954	12945	82.
83.	1719157	1715197	83.
84.	577557	577557	84.
85.	8546296	8564296	85.
86.	3881	3881	86.
87.	176532	175632	87.
88.	30652	30652	88.
89.	2127189	2128179	89.
90.	134695	134695	90.
91.	290753	290753	91.
92.	696696	669696	92.
93.	8994	4998	93.
94.	255	552	94.
95.	23572	23572	95.
96.	1774698	1774698	96.
97.	26654	25664	97.
98.	28307	28307	98.
99.	6707	6706	99.
100.	230722	230722	100.
101.	537554	537554	101.
102.	29047	29047	102.
103.	5665	6556	103.
104.	26552	26552	104.
105.	565942	656942	105.
106.	6791	6971	106.
107.	79391	79391	107.
108.	21263	21236	108.
109.	147	147	109.
110.	723	723	110.
111.	19934	19934	111.
112.	151167	151167	112.
113.	79881	78991	113.
114.	23836	23638	114.
115.	43307	43307	115.
116.	931496	931694	116.
117.	819141	819141	117.
118.	764744	764744	118.
119.	22385	22385	119
120.	34386	34368	120.
121.	389	398	121.
122.	9424099	9424099	122.
123.	550626	550262	123.
124.	81525	81525	124.
125.	24616	24616	125.

CHECKING—V

Below at the left is a handwritten list of names and street addresses of prospective customers in one city. At the right is the same group of names and addresses in typewritten form. If the two names are exactly the same, make a check mark in the space provided opposite the typed names. If the two addresses following the names are the same, make a check mark in the space provided. Each name and each address should be considered as separate questions with a separate response for each. If the written and printed names are different or if the written and printed addresses are different, make no mark.

1. Joseph R. Hansen
   1902 4th St.
2. Hugh K. Prentice
   1638 Main Street
3. Kenneth R. Adams
   4892 Church St.
4. Charles H. Gregory
   1301 Cedar Parkway
5. Barbara L. Wayne
   748 Forest Lane Road
6. Phillip E. Blackwood
   4105 Lancaster Road
7. Clayton R. Thompson
   1411 First St.
8. Alice S. Rockwell
   4679 5th Ave.
9. Victoria L. Phelps
   1453 5th Ave.
10. Norman L. Higgins
    1130 Fair Oaks Blvd.
11. Oliver J. Bigelow
    1925 Crescent Road
12. Michael C. Williams
    2802 Westmore St.
13. Ralph H. Halifax
    2309 Parkway

1. Joseph R. Hanson ____
   1902 4th St. ____
2. Hugh K. Prentice ____
   1638 Main Street ____
3. Kenneth R. Adams ____
   4892 Church St. ____
4. Charles H. Gregery ____
   1301 Cedar Parkway ____
5. Barbara L. Wynne ____
   748 Forest Lane Road ____
6. Phillip E. Blackwood ____
   4105 Lancaster Road ____
7. Clayton R. Thompson ____
   1411 First Street ____
8. Alice S. Rockwell ____
   4976 5th Ave. ____
9. Victoria L. Phelps ____
   1453 5th Ave. ____
10. Norman L. Higgins ____
    1130 Fair Oaks Blvd. ____
11. Oliver J. Bigelow ____
    1925 Crescent Road ____
12. Michael C. William ____
    2802 Westmore St. ____
13. Ralph H. Halifax ____
    2309 Parkway ____

CHECKING—V (continued)

14 Bertram M. Richardson
1850 Keystone Ave.

15. Raymond H. Porter
2342 Vincennes Ave.

16. Claire C. Bryant
8246 Market St.

17. Nicholas R. Douglas
2706 Summit St.

18. Louis H. Scott
3321 Ocean Avenue

19. Walter D. Matthews
1284 Central St.

20. Raymond G. Wilson
1032 Chapel Court

21. Eileen G. Kirk
2716 Clayburn St.

22. Edwin W. Lincoln
1526 Liberty Blvd.

23. Harvey K. Holman
1029 Jewel Road

24 Theodore K. Stanton
1203 Sherman Avenue

25. Ralph W. Olsen
4161 Bloomington Road

26. Leonard C. Russell
5035 Addison St.

27 Stewart A. Whitcomb
3615 Fairview Avenue

28 Vernon J. White
1702 Davis Blvd.

29 Donald R. Kelley
1529 Fairview St.

14. Bertram M. Richardsen ___
1850 Keystone Ave. ___

15. Raymond H. Porter ___
2432 Vincennes Ave. ___

16. Clare C. Bryant ___
8246 Market Street ___

17. Nicholas R. Douglass ___
2706 Summit St. ___

18. Louis H. Stott ___
3321 Ocean Avenue ___

19. Walter D. Matthews ___
1284 Central St. ___

20. Raymond G. Wilson ___
1032 Chapel Court ___

21. Eileen G. Kirk ___
2617 Clayburn St. ___

22. Edwin W. Lincoln ___
1526 Liberty Blvd. ___

23. Harvey K. Holman ___
1029 Jewel Road ___

24. Theodore K. Stanton ___
1203 Sherman Avenue ___

25. Ruth W. Olson ___
6141 Bloomington Road ___

26. Leonard C. Russel ___
5035 Addison St. ___

27. Stuart A. Whitcomb ___
3516 Fairview Avenue ___

28. Vernon J. White ___
1207 Davis Blvd. ___

29. Donald R. Kelly ___
1925 Fairview St. ___

CHECKING—V (continued)

30. Mildred C. Stevens
3639 Riverside Driveway

31. Gwendolyn M. Sterling
544 Maple Road

32. Gertrude B. Brewster
6408 Walnut St.

33. Henry C. Anderson
1511 Kings Road

34. Katharine B. Cox
2434 Union St.

35. James M. Goodwin
1621 Park St.

36. Helen B. Dunlap
5434 Lathrop Road

37. Harold A. Cameron
6954 Lakeside Drive

38. Bruce T. Schneider
1469 Forest Road

39. John S. Gillepsie
4718 Greenwood Ave.

40. Judson K. Starrett
1127 Parkside

41. Donald B. Kline
974 Westgate Road

42. Harry C. Archer
925 87th Court

43. Frances R. Montague
1459 Forsythe St.

44. Ronald H. Munford
1920 Meadow Road

45. Jeannette C. Hamilton
1535 Cornell Ave.

30. Mildred C. Stephens ___
3936 Riverside Driveway ___

31. GwendyIon M. Sterling ___
455 Maple Road ___

32. Gertrude B. Brewster ___
6408 Walnut St. ___

33. Henry C. Andersen ___
1511 Kings Road ___

34. Katherine B. Cox ___
2344 Union St. ___

35. James M. Goodwin ___
1621 Park St. ___

36. Helen B. Dunlop ___
3454 Lathrop Road ___

37. Harold H. Cameron ___
6954 Lakeside Drive ___

38. Bruce T. Schneider ___
1469 Forrest Road ___

39. John S. Gillepsie ___
4718 Greenwood Ave. ___

40. Judson K. Starrett ___
1127 Parkside ___

41. Donald B. Klein ___
947 Westgate Road ___

42. Harry C. Archer ___
925 87th Place ___

43. Francis R. Montague ___
1459 Forsyth St. ___

44. Ronald H. Mumford ___
1920 Meadow Road ___

45. Jeanette C. Hamilton ___
1535 Cornell St. ___

CLASSIFICATION-V

Following are the first lines of a number of letters received by a large company. The Key below indicates the departments to which they are to be sent. Indicate at the right of each question the department to which each letter should be referred by drawing a circle around the letter corresponding to the proper department.

KEY

O — *Order Department*—Handles all orders, requests far information concerning items, prices, dates of expected delivery.

B — *Bookkeeping Department*—Handles all billing, balances, boakkeeping detail, etc.

A — *Adjustment Department*—Decides what adjustments can be made and how much, complaints, service requests, etc.

P — *Personnel Department*—Handles all matters concerning employment, references, etc.

C — *Credit and Collection Department*—Handles all requests for credit, extensions, etc.

R — *Referral*—to a higher authority if classification is nat cavered above.

1. "Mary Brown, who states that she has been employed as bookkeeper in your accounting department, has applied to us for a position. What can you tell us concerning...?" O B A P C R
2. "Please send me information about your new Examo electric iron..." O B A P C R
3. "I am in the market for the following items..." O B A P C R
4. "The curling iron I bought recently at your appliance store is in need of repairs..." O B A P C R
5. "Will you please send me your booklet, Victory, as advertised in this morning's Tribune?" O B A P C R
6. "Your advertisement in the March 20 issue of the Saturday Evening Post has interested me in your line of electric ranges." O B A P C R
7. "I regret to inform you that the shipment, ordered by me on May 1 and shipped May 6, arrived this morning in damaged condition." O B A P C R
8. "I was surprised to learn from your letter of March 6 that it would cost $3.25 to repair the scales which I recently returned to you." O B A P C R
9. "I saw your ad in last night's Evening News, and would like further information about the product described..." O B A P C R
10. "Please send me on approval a sample set of your..." O B A P C R
11. "I am using Nu-Brand collars exclusively and would like to know why they break after a few washings in almost every case where they fasten." O B A P C R
12. "I am applying for the position as typist which was advertised in..." O B A P C R
13. "I should like an extension of sixty days on my recent bill." O B A P C R
14. "In line with your suggestions, I submit my qualifications." O B A P C R
15. "I would like to take this opportunity of congratulating your organization on the fine quality of work you have been doing..." O B A P C R

CLASSIFICATION-V (continued)

16. "We have an application from James White, employed by you as Assistant Sales Manager for a period of two years, for the position of Sales Manager." O B A P C R

17. "We enclose our check for $12.95, covering your invoice No. 845." O B A P C R

18. "When I called at your office a few days ago, you reserved for me a set..." O B A P C R

19. "Will you please send to the address given below a list of all your materials, together with prices for the same?" O B A P C R

20. "We are disappointed in the last shipment of bags which were ordered from your salesman. The bags seemed inferior..." O B A P C R

21. "I regret that I am unable to make payment this month, as per our agreement..." O B A P C R

22. "I am returning the merchandise which you recently shipped since it is not according to our specifications." O B A P C R

23. "Harold Smith, an employee in your organization, has filed an application to open a credit account. Will you please confirm...?" O B A P C R

24 "Please send us at your earliest convenience, price list on paints, together with your best terms." O B A P C R

25. "I would like to make arrangements to pay my bill in six monthly installments." O B A P C R

26. "Please forward by American Express, C.O.D., the following items:..." O B A P C R

27. "I should like to open a charge account with your store, and refer you to..." O B A P C R

28. "Though I wrote two weeks ago requesting samples of certain materials, I have heard nothing from you so far." O B A P C R

29. "Please cancel my purchase order D16438..." O B A P C R

30. "Your estimate for completing my set is satisfactory, and you may proceed to fill the items." O B A P C R

31. "Due to our curtailed budget for this year, I find it necessary to discontinue my subscription to your materials." O B A P C R

32. "Enclosed you will please find an invoice sent to my office by mistake..." O B A P C R

33. "I am enclosing a check in payment for the materials which I recently ordered." O B A P C R

34 "In reference to the enclosed invoice for purchase of your materials, I wish to state..." O B A P C R

35. "Replying to your letter of May 1, we will mail another check in a few days, to be applied on our balance." O B A P C R

36. "Will you kindly WIRE the Postmaster of Springfield, Illinois, at once upon receipt of this letter to release the C.O.D. on my shoes $14.85, as I, per your instructions, wired you the money on April 2." O B A P C R

CLASSIFICATION - N

Following are listed a number of invoices covering the account of a salesman. Classify these and total the amounts for each month in which the sales occurred.

Date	Invoice Number	Amount
5/8	64209	$ 33.36
12/7	69149	16.76
3/4	62141	118.35
12/17	69487	52.35
9/8	66391	32.75
11/17	68480	9.32
5/15	64378	71.32
4/14	63563	47.50
6/11	65429	65.75
12/11	69353	47.15
10/5	67141	95.80
1/7	60298	21.54
5/12	64278	55.39
2/8	61162	31.94
11/15	68398	248.10
12/13	69409	14.80
5/3	64112	16.78
9/22	66701	284.38
3/17	62546	11.10
1/13	60282	38.67
10/12	67327	20.75
9/14	66559	250.87
5/7	64167	9.55
6/6	65312	28.10
1/7	60135	56.94
2/1	61104	15.12
4/9	63268	28.20
5/17	64418	37.50
2/3	61121	22.75
11/8	68156	13.75
1/10	60163	10.85
10/8	67251	36.90
2/11	61213	65.87
6/15	65468	20.55
4/8	63246	26.53
3/6	62182	91.61
4/23	63723	25.20
6/7	65343	14.95
3/19	62595	35.60
10/24	67614	77.62
4/17	63683	34.66
9/14	66539	36.90
2/28	61426	11.52
6/17	65491	13.50
4/10	63301	47.86

January	June

February	September

March	October

April	November

May	December

TOTAL

Jan. _____

Feb. _____

Mar. _____

Apr. _____

May _____

June _____

Sept. _____

Oct. _____

Nov. _____

Dec. _____

Now compute the bonus which the salesman received each month if a 5% bonus is paid on sales over $250, and 10% is paid for $500 or over.

BONUS

Jan. _____

Feb. _____

Mar. _____

Apr. _____

May _____

June _____

Sept. _____

Oct. _____

Nov. _____

Dec. _____

CONSTRUCTED AND STANDARDIZED
by
FLOYD RUCH

SURVEY OF WORKING SPEED AND ACCURACY

Name:..... Sex: Male..... Female ..... Date.....

Organization:.....Position:.....

	Score	%-ile	To Chart Percentile Ranks 1	10	20	30	40	50	60	70	80	90	99
Test 1, Number Checking	_____	_____											
Test 2, Code Translation	_____	_____											
Test 3, Finger Dexterity	_____	_____											
Test 4, Counting	_____	_____											

The purpose of this group of tests is to measure your aptitude for work requiring speed and accuracy. If you have had no previous experience in a certain type of work, your score on these tests will tell how well you will do *after* you have had the necessary training.

DO NOT OPEN THIS BOOKLET UNTIL THE EXAMINER TELLS YOU TO.

Directions for Test 1, Number Checking Look at the samples which follow and complete the unfinished ones. You are to compare the figures in the column at the left with those in the column at the right. If the two sets of figures are *exactly* the same, put a check mark (√) on the line. If the two figures are different in any way, put an *X* on the line.

471	471	√
3265	$3256	*X*
$625	$625	_____
234	324	_____

Notice that the second example is marked with an *X*. Any difference whatever is to be marked with an *X*.

When the examiner says GO, turn to the next page and check as many pairs of numbers as you can in five minutes. Work as rapidly and accurately as you can. The examiner will tell you when to stop.

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Published by California Test Bureau
5916 Hollywood Boulevard, Los Angeles 28, California

1.	73	73	____
2.	419	914	____
3.	7390	7390	____
4.	86241	86421	____
5.	$14.14	$14.15	____
6.	69.2	6902	____
7.	43%	43%	____
8.	625%	$625	____
9.	4972	4972	____
10.	9673826	9673826	____
11.	867325	86732	____
12.	253694	258694	____
13.	984.3	98403	____
14.	$91.25	$91.25	____
15.	14.50%	$14.50	____
16.	865421	865421	____
17.	91.343	91.343	____
18.	21.304	211304	____
19.	49	94	____
20.	87X	87X	____
21.	211.45	21.145	____
22.	685.291	685291	____
23.	— 43	43%	____
24.	854,901	845,901	____
25.	1260	1206	____
26.	9864	9864	____
27.	7582	7528	____
28.	.4123	4.123	____
29.	328	378	____
30	699666	699666	____
31.	200.02	2000.2	____
32.	235A	235A	____
33.	98.4	98.4	____
34.	16	61	____
35.	1.008	1.008	____
36.	6590.32	650.935	____
37.	7066	7606	____
38.	11307	11035	____
39.	.56%	.56%	____
40.	44912	44912	____
41.	$31.13	$31.13	____
42.	112.11	121.11	____
43.	329X	328Y	____
44.	3974	3974	____
45.	.48965	.48964	____
46.	389742	399742	____
47.	250%	250%	____
48.	29.136	29.163	____
49.	$43.91	$43.90	____
50.	684.213	6842.13	____
51.	493,275	493,275	____
52.	42.5	42.5	____
53.	$81.94	$81.94	____
54.	999.97R	99.997S	____
55.	.2356	.2356	____
56.	413.569	413,569	____
57.	$92.37	$92.73	____
58.	2.4134	2.4134	____
59.	6935437	6935437	____
60.	64%	64%	____
61.	29.5%	2.95%	____
62.	— 43.25	43.25	____
63.	213.7	213.4	____
64.	19654	19654	____
65.	23.621	23.621	____
66.	41.246	41.426	____
67.	$24,94	$24.94	____
68.	18659	18,659	____
69.	1.90	1.96	____
70.	2843.21	28432.1	____
71.	444.4	44.44	____
72.	$39.66	$39.66	____
73.	43.24	43.42	____
74.	89,643	89,634	____
75.	.023	.023	____
76.	$438.49	$483.94	____
77.	934,454	943,454	____
78.	89.4%	89.4%	____
79.	43.9943	439.943	____
80.	— 42.5	— 42.5	____
81.	810.3	819.3	____
82.	439254	439345	____
83.	.4859	.4859	____
84.	691.111	6911.11	____
85.	879,213,442	8779,231,442	____
86.	— 68.49	— 68.49	____
87.	87.9%	8.79%	____
88.	459¼	459½	____
89.	987,757	987,575	____
90.	45.682	45.682	____
91.	.213	.213	____
92.	.0000006	.000006	____
93.	1111.16	1111.116	____
94.	937.6	937.6	____
95.	2211345	2211435	____
96.	*453	$453	____
97.	466833	466893	____
98.	45567	45567	____
99.	23311.1	2311.11	____
100.	54665N	54665N	____
101.	7349	7349	____
102.	23	23	____
103.	642F	643P	____
104.	$21	21	____
105.	894561	894561	____
106.	471%	471*	____
107.	9999	99999	____
108.	878	887	____
109.	44.13	44.13	____
110.	1818	181.8	____
111.	41376	41376	____
112.	1897461	1897461	____
113.	11.1113	111.113	____
114.	97¼%	97½%	____
115.	— 976153	— 976135	____
116.	435M469	435M649	____
117.	89.356	89.356	____
118.	11,111,111	11,111,111	____
119.	$98.99	$89.99	____
120.	450-A	450-A	____
121.	76.449	764.49	____
122.	876.5	876.5	____
123.	45%	45%	____
124.	9856	9865	____
125.	83215.6	8321.56	____
126.	36741	36471	____
127.	1939	1939	____
128.	763½	763½	____
129.	2245	2246	____
130.	45-S643	45-S643	____
131.	1/879	1/8.79	____
132.	37.79	37.79	____
133.	86453	87453	____
134.	1260	1620	____
135.	9864	9864	____
136.	75823	75832	____
137.	88,888	88,888	____
138.	87.7654	87.654	____
139.	45¼	45¼%	____
140.	80.0	80.1	____
141.	53862	53862	____
142.	849.388	849.388	____
143.	643.986	643.986	____
144.	418.181	418.188	____
145.	63⅖	63⅖	____
146.	$866.66	$866.66	____
147.	— 853.99	— 583.99	____
148.	65 9/10	65 9/10	____
149.	87/4377	87/4377	____
150.	$4444.44	$444.44	____

Number right..... minus number wrong..... equals SCORE.....

Directions for Test 2, Code Translation: When the examiner says GO, you are to translate a passage which is given in code. The code is made up by assigning numbers to the letters of the alphabet. To translate you look up each number in the key to see what letter it stands for. You then write that letter in the proper space below the number.

THE KEY

1	2	3	4	5	6	7	8	9	10	11	12	13
L	I	A	D	F	Q	T	W	X	N	Z	B	E
14	15	16	17	18	19	20	21	22	23	24	25	26
G	J	M	O	R	U	Y	C	H	K	P	V	S

Work as rapidly as you can without making mistakes. Your score is the number of lines translated without error in five minutes.

The first line in the message is already translated to show how it is done. An * indicates the end of a word or sentence.

(1) 7 22 13 * 24 19 18 24 17 26 13 * 17 5 * 7 13 26
T H E P U R P O S E O F T E S

(2) 7 26 * 26 19 21 22 * 3 26 * 7 22 13 * 17 10 13 * 7

(3) 22 3 7 * 20 17 19 * 3 18 13 * 10 17 8 * 7 3 23 2

(4) 10 14 * 2 26 * 7 17 * 16 13 3 26 19 18 13 * 20 17

(5) 19 18 * 3 24 7 2 7 19 4 13 26 * 5 17 18 * 17 5

(6) 5 2 21 13 * 8 17 18 23 * 7 22 13 18 13 * 3 18

(7) 13 * 16 3 10 20 * 23 2 10 4 26 * 17 5 * 8 17 18 23

(8) 7 17 * 12 13 * 4 17 10 13 * 2 10 * 7 22 13 * 8 17

(9) 18 1 4 * 26 17 16 13 * 15 17 12 26 * 18 13 6 19 2

(10) 18 13 * 21 1 13 18 2 21 3 1 * 3 12 2 1 2 7 20

(11) 3 10 4 * 26 17 16 13 * 15 17 12 26 * 18 13 6 19

(12) 2 18 13 * 16 13 21 22 3 10 2 21 3 1 * 3 12 2

(13) 1 2 7 20 * 7 13 26 7 26 * 13 10 3 12 1 13 * 7

(14) 22 13 * 13 16 24 1 17 20 13 18 * 7 17 * 24 1 3 21 13

(15) 7 22 13 * 13 16 24 1 17 20 13 13 * 17 10 * 7 22

(16) 13 * 15 17 12 * 3 7 * 8 22 2 21 22 * 22 13 * 2

(17) 26 * 16 17 26 7 * 1 2 23 13 1 20 * 7 17 * 26

(18) 19 21 21 13 13 4 * 2 10 * 7 22 2 26 * 8 3 20

(19) 12 17 7 22 * 24 3 18 7 2 13 26 * 3 18 13 * 12

(20) 13 7 7 13 18 * 17 5 5 * 7 22 3 10 * 7 22 13

Number right..... minus number wrong..... equals SCORE.....

Directions for Test 3, Finger Dexterity: When the examiner says GO, put a pencil dot in each of the O's working from left to right or from right to left. Work as rapidly and as accurately as you can. The time limit is five minutes. Dots must not touch O's.

O O O O O O O O O O O O O O O O O O O O (1)
O O O O O O O O O O O O O O O O O O O O (2)
O O O O O O O O O O O O O O O O O O O O (3)
O O O O O O O O O O O O O O O O O O O O (4)
O O O O O O O O O O O O O O O O O O O O (5)
O O O O O O O O O O O O O O O O O O O O (6)
O O O O O O O O O O O O O O O O O O O O (7)
O O O O O O O O O O O O O O O O O O O O (8)
O O O O O O O O O O O O O O O O O O O O (9)
O O O O O O O O O O O O O O O O O O O O (10)
O O O O O O O O O O O O O O O O O O O O (11)
O O O O O O O O O O O O O O O O O O O O (12)
O O O O O O O O O O O O O O O O O O O O (13)
O O O O O O O O O O O O O O O O O O O O (14)
O O O O O O O O O O O O O O O O O O O O (15)
O O O O O O O O O O O O O O O O O O O O (16)
O O O O O O O O O O O O O O O O O O O O (17)
O O O O O O O O O O O O O O O O O O O O (18)
O O O O O O O O O O O O O O O O O O O O (19)
O O O O O O O O O O O O O O O O O O O O (20)
O O O O O O O O O O O O O O O O O O O O (21)
O O O O O O O O O O O O O O O O O O O O (22)
O O O O O O O O O O O O O O O O O O O O (23)
O O O O O O O O O O O O O O O O O O O O (24)
O O O O O O O O O O O O O O O O O O O O (25)
O O O O O O O O O O O O O O O O O O O O (26)
O O O O O O O O O O O O O O O O O O O O (27)
O O O O O O O O O O O O O O O O O O O O (28)
O O O O O O O O O O O O O O O O O O O O (29)
O O O O O O O O O O O O O O O O O O O O (30)
O O O O O O O O O O O O O O O O O O O O (31)
O O O O O O O O O O O O O O O O O O O O (32)
O O O O O O O O O O O O O O O O O O O O (33)
O O O O O O O O O O O O O O O O O O O O (34)
O O O O O O O O O O O O O O O O O O O O (35)
O O O O O O O O O O O O O O O O O O O O (36)
O O O O O O O O O O O O O O O O O O O O (37)
O O O O O O O O O O O O O O O O O O O O (38)
O O O O O O O O O O O O O O O O O O O O (39)
O O O O O O O O O O O O O O O O O O O O (40)
O O O O O O O O O O O O O O O O O O O O (41)
O O O O O O O O O O O O O O O O O O O O (42)
O O O O O O O O O O O O O O O O O O O O (43)
O O O O O O O O O O O O O O O O O O O O (44)
O O O O O O O O O O O O O O O O O O O O (45)
O O O O O O O O O O O O O O O O O O O O (46)
O O O O O O O O O O O O O O O O O O O O (47)
O O O O O O O O O O O O O O O O O O O O (48)
O O O O O O O O O O O O O O O O O O O O (49)
O O O O O O O O O O O O O O O O O O O O (50)

Twice the number right; minus
10 times the number wrong equals SCORE.....

Directions for Test 4, Counting: This task consists of counting each of the vowels in each line. You will notice that there are forty lines of text below. At the end of each line there are five blanks headed A, E, I, O, and U. For each line you are to count and record the number of each of those letters in the line. Count all five vowels and record them for each line before going on to the next line. If a particular vowel does not occur in a given line, record an O in the appropriate blank at the end of the line. Take the lines in order. Count one vowel at a time.

Line (1) is done to show you what is required. Work as rapidly and as accurately as you can. You will have five minutes to do as much of this task as you can.

(1)	The statement that all men are created equal	A's (*6*)	E's (*8*)	*I's* (*0*)	O's (*0*)	U's (*1*)
(2)	in all things is not true. This fact about human	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(3)	nature has been proven many times through	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(4)	carefully conducted observations by men and	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(5)	women trained in applying scientific methods	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(6)	to the study of human nature. The quickest	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(7)	person in an office or shop can usually turn out	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(8)	about twice as much work as the slowest one.	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(9)	We are so used to the idea that people differ	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(10)	among themselves in their ability to do differ-	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(11)	ent tasks that we can hardly imagine what the	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(12)	world would be like if people were all alike.	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(13)	Imagine a society in which persons were as like	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(14)	as two peas in a pod. Life in such a society	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(15)	would be dull and uninteresting and much	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(16)	harder than it is in our own society. Division	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(17)	of labor would be arbitrary and unjust. The	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(18)	teacher, the business person, the physician, the	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(19)	mechanic, the clerk and the day laborer would	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(20)	be identical in their likes, dislikes, interests,	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(21)	abilities and intelligence. There would be no	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(22)	such thing as personality because personality	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(23)	implies that the individual possesses some in-	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(24)	dividuality or peculiarity that sets him apart	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(25)	from other individuals. A society in which all	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(26)	individuals were created equal would be as	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(27)	inefficient as it would be dull. It would not	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(28)	matter what job a certain person was assigned	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(29)	to nor what profession another person entered	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(30)	because one would be just as able as another	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(31)	on any particular job. In a society composed	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(32)	of identical individuals we might just as well	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(33)	choose our friends by lot, since we could not	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(34)	choose them on the basis of mutual likes and	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(35)	dislikes. Our society is not as efficient as it	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(36)	should be. Part of this inefficiency is due to	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(37)	the fact that we do not always pay as much	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(38)	attention to the fact that individuals differ as	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(39)	we should. For example, certain persons are	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )
(40)	better at a particular kind of work than others.	A's ( )	E's ( )	I's ( )	O's ( )	U's ( )

SCORE equals number of right counts.....

APPENDIX B

RATING DATA

Rating Instructions

Rating Work Sheet

Job Analysis Card

RATING INSTRUCTIONS

The value of a test battery is ascertained by the way in which the test results compare with a criterion. In the case of the office group, the criterion is the rating of each employee.

The tests for which the criterion is being prepared purport to be measures of speed, accuracy, ability to think, and aptitude for typical clerical tasks such as checking numbers, posting amounts, filing, etc. Personality is not a factor and therefore should not in any way influence the ratings. If we had production rates such as those computed for factory piece work, our problem of rating would be easier and our results objective. Production rates for office workers are impossible to obtain; so we must use the rating of a capable judge.

The factors of characteristics to be judged are as follows:

Speed	Ability to learn
Accuracy	Initiative
Dependability	

You are to consider each worker on these five characteristics and assign her a total composite rating according to the following scale:

5 -- Excellent -- Worker has the optimum combination of these five traits

4 -- Very Good -- Worker's combination of these traits is better than the average

3 -- Good -- Worker is average; no better, no worse, than the majority

2 -- Fair -- Worker is generally satisfactory with occasional lapses

1 -- The least satisfactory- Worker is significantly lacking in these traits.

Rating is no easy task. The rater must use his best judgment; he must be fair; he must be unprejudiced. Many raters, especially in business and industry, are inclined to over rate. This tendency is understandable inasmuch as employees are usually hired on a permanent basis because they have proven to be satisfactory. It will clarify matters to point out that this rating is two-fold: First, you are rating on the basis of ability to do the work, and second, you are comparing the employees with each other. Therefore, the largest group of workers will be "good" or have "3" ratings. A rating of"5" is reserved for the very best workers; a rating of "1" indicates that a person is of little value to the com any and, other things being equal, would be the first to be laid off.

The graphic scale shown on the next page is merely to help guide your thinking and to be used for reference when you are deciding on the ratings.

Trait	Description				
Speed	very fast	rapid	moderate	slow	very slow
Accuracy	no errors	very careful	few errors	care-less	many errors
Ability to learn	very quick	learns easily	ordinary	slow	very slow
Dependa-bility	very re-liable	trust-worthy	usually reliable		unreliable
Initiative	assumes responsi-bility	resource ful	carries out sug-gestions	needs super-vision	needs detailed super.
Rating	5	4	3	2	1

The work sheet which is attached may help you to keep in mind the factors to be judged. The totalrating need not be the numerical average of the values assigned to each of the five traits. The purpose of the work sheet is merely that of a tool to help you arrive at your total rating for each individual.

RATING WORK SHEET

The ratings to be assigned:

5 -- Excellent -- Worker has the optimum combination of these five traits

4 -- Very Good -- Worker's combination of these traits is better than the average

3 -- Good -- Worker is average; no better, no worse, than the majority

2 -- Fair -- Worker is generally satisfactory with occasional lapses

1 -- The least satisfactory -- Worker is significantly lacking in these traits

Traits						
Speed	Accuracy	Ability to learn	Depend-ability	Initi-ative	Name	Rate

JOB SPECIFICATION

Job Title
General Duties

Date_____

Hours Worked
1st Shift ☐ 3rd Shift ☐
2nd Shift ☐ All Shifts ☐

SEX: Male ☐
Female ☐
HEIGHT: Minimum ft in.
Maximum ft in
WEIGHT: Minimum
Maximum

PHYSICAL CHARACTERISTICS OF WORK

Floor	☐	Light	☐	Eye strain	☐	Hot	☐	Clean	☐	Variety	☐
Bench	☐	Medium	☐	Noisy	☐	Cold	☐	Dirty	☐	Repetitive	☐
Machine	☐	Heavy	☐	Smokey	☐	Dry	☐	In oil	☐	Automatic	☐
Scaffold	☐	Standing	☐	Dusty	☐		☐	In acids	☐	Slow	☐
Inside	☐	Sitting	☐	Damp	☐		☐	In water	☐	Medium	☐
Outside	☐	Walking	☐							Rapid	☐

MENTAL AND PHYSICAL CHARACTERISTICS OF WORKER

Talk	☐	Copy figures	☐	Dexterous	☐	Accurate	☐	Hardy	☐
Read	☐	Add	☐	Left hand	☐	Read Micrometer	☐	Muscular	☐
Write	☐	Subtract	☐	Right hand	☐	Read Blue Prints	☐	Athletic	☐
Spell	☐	Multiply	☐	Acute hearing	☐		☐	Active	☐
Dictate	☐	Decimals	☐	Pick colors	☐		☐	Agile	☐

JOB SPECIFICATION

Job Title
General Duties

Date_____

Hours Worked
1st Shift ☐ 3rd Shift ☐
2nd Shift ☐ All Shifts ☐

SEX: Male ☐
Female ☐
HEIGHT: Minimum ft in.
Maximum ft in
WEIGHT: Minimum
Maximum

PHYSICAL CHARACTERISTICS OF WORK

Floor	☐	Light	☐	Eye strain	☐	Hot	☐	Clean	☐	Variety	☐
Bench	☐	Medium	☐	Noisy	☐	Cold	☐	Dirty	☐	Repetitive	☐
Machine	☐	Heavy	☐	Smokey	☐	Dry	☐	In oil	☐	Automatic	☐
Scaffold	☐	Standing	☐	Dusty	☐		☐	In acids	☐	Slow	☐
Inside	☐	Sitting	☐	Damp	☐		☐	In water	☐	Medium	☐
Outside	☐	Walking	☐							Rapid	☐

MENTAL AND PHYSICAL CHARACTERISTICS OF WORKER

Talk	☐	Copy figures	☐	Dexterous	☐	Accurate	☐	Hardy	☐		
Read	☐	Add	☐	Left hand	☐	Read Micrometer	☐	Muscular	☐		
Write	☐	Subtract	☐	Right hand	☐	Read Blue Prints	☐	Athletic	☐		
Spell	☐	Multiply	☐	Acute hearing	☐		☐	Active	☐		
Dictate	☐	Decimals	☐	Pick colors	☐		☐	Agile	☐		

Basic Knowledge _____

Experience: _____

Training Required: _____

Equipment Used: _____

W A G E S

- Hourly Rate ☐
- Hourly Rate plus Bonus ☐
- Piece Work ☐
- Wage plus bonus ☐
- Salary ☐
- Salary plus Bonus ☐
- MERIT RATING ☐

R E M A R K S

JOB SPECIFICATION

Job Title
General Duties

Date_____

Hours Worked
1st Shift ☐ 3rd Shift ☐
2nd Shift ☐ All Shifts ☐

SEX: Male ☐
Female ☐
HEIGHT: Minimum [illegible] in.
Maximum [illegible] in.
WEIGHT: Minimum
Maximum

PHYSICAL CHARACTERISTICS OF WORK

Floor	☐	Light	☐	Eye strain	☐	Hot	☐	Clean	☐	Variety	☐
Bench	☐	Medium	☐	Noisy	☐	Cold	☐	Dirty	☐	Repetitive	☐
Machine	☐	Heavy	☐	Smokey	☐	Dry	☐	In oil	☐	Automatic	☐
Scaffold	☐	Standing	☐	Dusty	☐		☐	In acids	☐	Slow	☐
Inside	☐	Sitting	☐	Damp	☐		☐	In water	☐	Medium	☐
Outside	☐	Walking	☐							Rapid	☐

MENTAL AND PHYSICAL CHARACTERISTICS OF WORKER

Talk	☐	Copy figures	☐	Dexterous	☐	Accurate	☐	Hardy	☐		
Read	☐	Add	☐	Left hand	☐	Read Micrometer	☐	Muscular	☐		
Write	☐	Subtract	☐	Right hand	☐	Read Blue Prints	☐	Athletic	☐		
Spell	☐	Multiply	☐	Acute hearing	☐			Active	☐		
Dictate	☐	Decimals	☐	Pick colors	☐			Agile	☐		

Basic Knowledge _____

Experience: _____

Training Required: _____

Equipment Used: _____

WAGES

- Hourly Rate ☐
- Hourly Rate plus Bonus ☐
- Piece Work ☐
- Wage plus bonus ☐
- Salary ☐
- Salary plus Bonus ☐
- MERIT RATING ☐

REMARKS

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